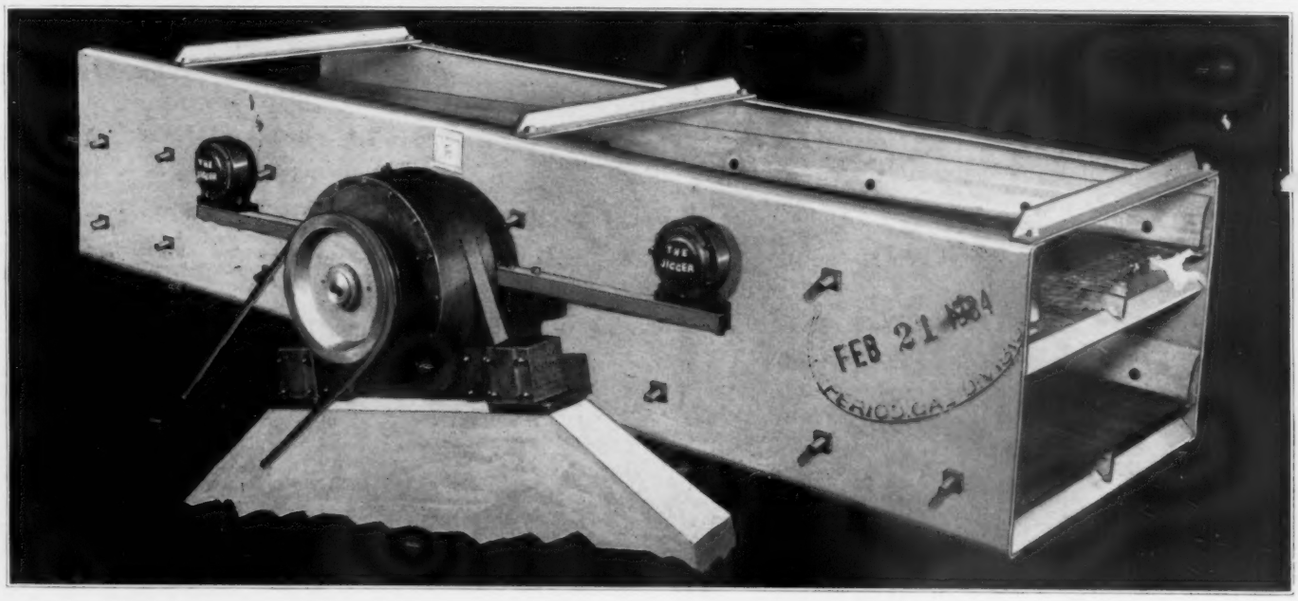
Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

February, 1934



THE SAFETY JIGGER "CIRCLE THROW" VIBRATING SCREEN - - - WITH VIBRATION TO SUIT THE MATERIAL

• No two materials screen alike. Even though they come from the same deposit there are often daily changes that make necessary a change in screen vibration for maximum efficiency.

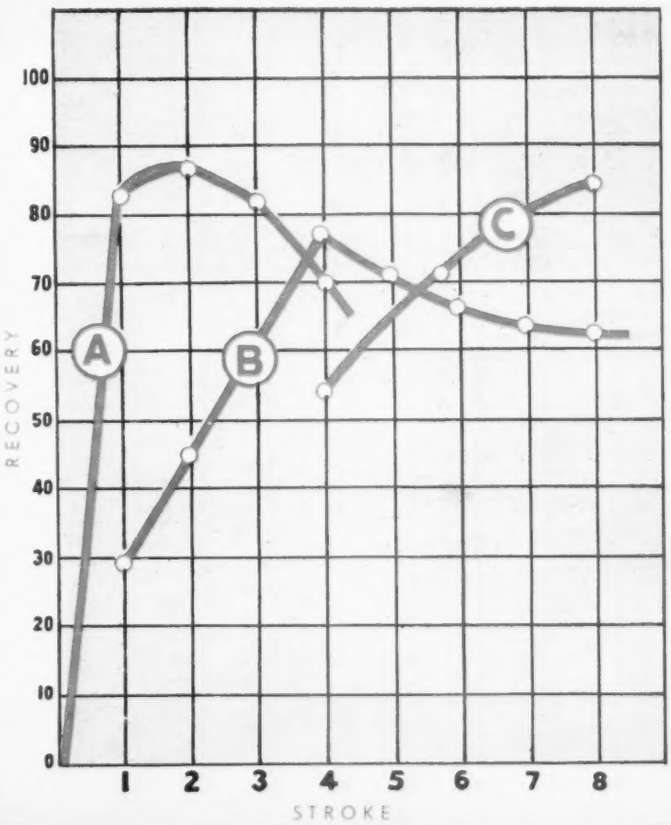
The chart on the right shows how three different materials vary in screening. Note how a change in vibration increases or decreases the efficiency of each. How, then, can the relationship of material to vibration be predetermined at the screen factory?

JIGGER engineers advocate determining this at *your plant* with *your product.*

That's the reason JIGGER screens are *producing more and giving a better product.*

And that's the reason more than 50% of all JIGGER installations replace other screening equipment.

Write today—let a JIGGER engineer help solve your screening problems—no obligation, of course.



PRODUCTIVE EQUIPMENT CORP.

210 E. Ohio St. Chicago, Ill.

★ Pages 21-23

Selfvulc

NEW Lease of Life for Ageing Belts

BEFORE—Typical section of badly worn conveyor belt that looks "beyond repair."

AFTER—Same belt resurfaced with SELFVULC and restored to use better than ever.

DOUBLE the durability of your old belts by repairing and resurfacing them with SELFVULC as the life of your belts is just as long as you can keep the fabric from exposure.

This self-curing plastic rubber compound offers a simple and economical method of making repairs. SELFVULC is applied cold in paste form. Where the rubber covering is worn away, a new surface of SELFVULC will last longer than the original belt. Applied to joints, it keeps moisture and grit from working into the rivet holes, eliminates freezeups and lessens abrasive wear. Worn edges, holes, gouges, tears, easily repaired—with SELFVULC.

SELFVULC has scores of other uses, covering pipes, cables, lining chutes, protecting steel, wood, cement and brick surfaces. One application of SELFVULC will save many times its cost. "SELFVULCANIZE TO ECONOMIZE." When ordering for application to steel specify "M" Primer.

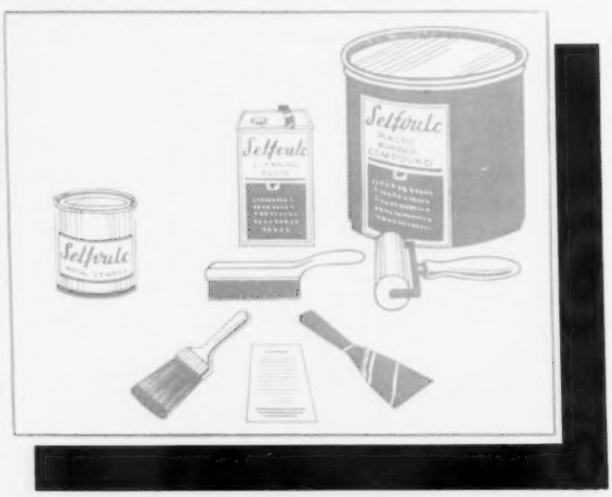
The best belt insurance known is a supply of SELFVULC on hand for immediate repairs.

$37.50 for 25 lbs. of SELFVULC with cleaning fluid, Primer, and tools for applying. Mail coupon today for this complete

NEW BELTS from OLD

Selfvulc

37.50 TRIAL OUTFIT



SELF-VULCANIZING RUBBER CO., INC.
605 W. Washington Blvd., Chicago, Ill.

Gentlemen:

Please enter our order for one complete TRIAL OUTFIT No. 3 SELFVULC PLASTIC RUBBER COMPOUND at $37.50 F.O.B. Chicago.. Weight about 40 lbs.....Freight .....Express.

Name of Company .....

Address .....

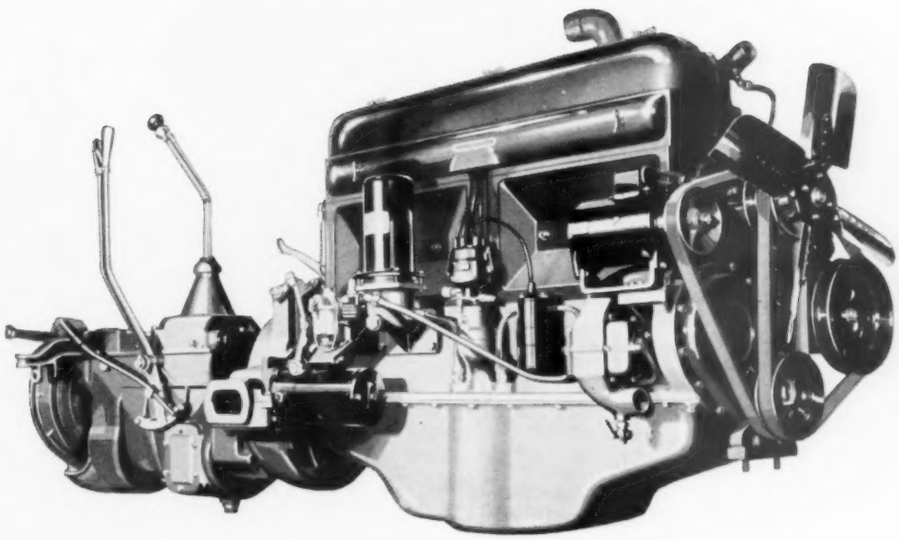
By .....

GENERAL MOTORS TRUCK COMPANY

presents

A NEW ENGINE

GMC 450



DEVELOPING the highest sustained torque of any truck engine in its capacity range . . . and delivering maximum torque from 800 to 1200 r.p.m. . . . the new GMC 450 engine fully maintains the reputation for capability which the GMC line has established. In spite of its 120 horsepower, developed at 2300 r.p.m., this new 450 is characterized by *high* operating economy.

Like its companions, the new GMC 450 power plant is of 6-cylinder valve-in-head GMC design. Its features and improvements include down-draft carburetion; crankcase ventilation; oil temperature regulator; full pressure lubrication; and airplane type, steel backed, copper lead alloy precision bearings.

The GMC 450 is designed for heavy duty service. Completely truck-engineered and truck-built, it is a worthy addition to the famous group of GMC truck engines.

CHECK THESE FEATURES OF VALUE—ECONOMY—DEPENDABILITY

1 The highest sustained torque in its capacity range—340 ft. lbs. at 800 to 1200 r.p.m.

2 120 horsepower at 2300 r.p.m.

3 GMC valve-in-head design—for greater power and efficiency.

4 Down-draft carburetion—for maximum torque over a wide speed range.

5 Roller bearing centrifugal water pump—front mounted to provide large generator space.

6 Crankcase ventilation—to maintain oil quality.

7 Oil temperature regulator—to protect bearings by keeping oil temperature at normal.

8 Full pressure bearing lubrication.

9 Tulip type exhaust valves, stellite seats.

10 Balanced and counterweighted four-bearing crankshaft.

GENERAL MOTORS TRUCKS and Trailers

GENERAL MOTORS TRUCK COMPANY — *Time Payments Available Through Our Own Y. M. A. C.* — PONTIAC, MICHIGAN

Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 26 February, 1934 Number 8

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter November 28, 1932, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.

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In This Issue

News of the Industry 21

Editorial 24

Simplification of Machinery Effects Big Savings in Silica-Plant Costs 26

Mineral-Aggregate Producers View Future in Spirit of Renewed Optimism 28

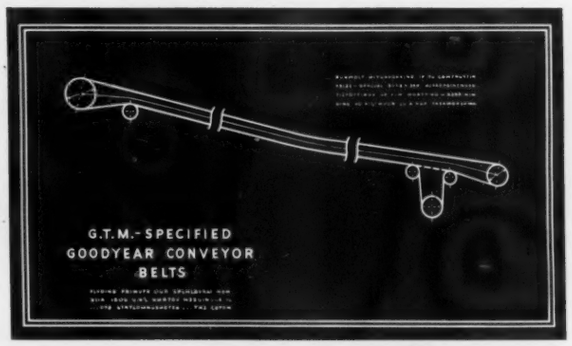
New Jersey's Newest Crushed-Stone Plant Uses Tower System of Storage 39

Premixed-Concrete Men Favor Petition for Direct Cement Purchasing 45

Men of the Industry 47
Personal Mention 48
Coming Events 48
Aggregates Statistics 49
Latest Cement Statistics 52
Traffic News and Comment 53
New Machinery and Supplies 55

NRA MEMBER U.S. WE DO OUR PART

He cut the Belt to pieces before our very eyes, and this is what he said:



BELTS
MOLDED GOODS
HOSE
PACKING

Made by the
Makers of GOODYEAR TIRES

HE IS an eminent engineer, and an eminently practical one, too.

His projects, and the installations which he has supervised, are conceded to be the models for the entire industry in which he works.

Talking about conveyor belts, he reached into a drawer, took out an old section of Goodyear Belt that had carried 24,000,000 tons, and with his strong-jawed pliers and might and main (and the aid of a couple of bystanders) tore its plies apart.

You could see and feel and hear the friction rubber between those cotton cord plies holding fast and stretching and finally giving way. He tossed the torn belt section onto the desk, saying:

"I would rather have this old belt right now than many a new one

"THAT'S what you ought to tell the world about Goodyear Belts! Goodyear knows how to send the friction through the fabric so that every individual thread of every cord is impregnated with rubber, so that the carcass never separates and every individual cord carries its full share of the load.

"This section is from a Goodyear Conveyor Belt that has seen seven years of service and carried 24,000,000 tons. Right now it is as good today as many a new belt of ordinary construction, and I'd rather have it."

Goodyear Mechanical Rubber Goods are accurately specified to the job by the G. T. M.—Goodyear Technical Man. They do better work, save money, make money for their users. Why not talk with the G. T. M.? Communicate with Goodyear, Akron, Ohio, or Los Angeles, California, or your nearest Goodyear Mechanical Rubber Goods Distributor.

NRA
WE DO OUR PART

THE GREATEST NAME IN RUBBER

GOODYEAR

INSTANTLY...

A "FINGER PRINT" OF SILVER IDENTIFIES QUALITY!

FINGER PRINTS—positive identification of individual persons—find a perfect simile in the silver colored strand that runs throughout the length of American Steel & Wire Company Monitor Silver Strand Wire Rope. In this case, however, quality is the factor identified—positive assurance of superior performance and utmost economy. In Monitor Silver Strand Wire Rope—the strongest grade of steel used in wire rope construction assures strength to spare. Also, of great value, are its lightness and abrasion resisting qualities.

AMERICAN STEEL & WIRE COMPANY

MONITOR

SILVER STRAND WIRE ROPE

1831

1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

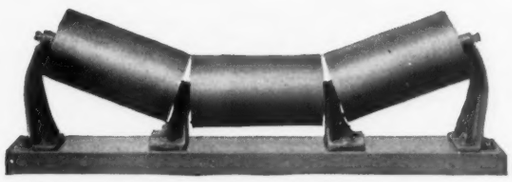
Empire State Building, New York
First National Bank Building, Baltimore

Pacific Coast Distributors: Columbia Steel Company, Russ Bldg., San Francisco

Export Distributors: United States Steel Products Company, New York

PRODUCTION COST MUST BE REDUCED

The 1934 plant must produce stone, sand, gravel, or slag of high quality at minimum cost and to meet more rigid specifications than ever before. This can be done in only one way. All out-of-date, outworn, inefficient equipment must be replaced with units designed and built to meet just such conditions. Robins offers you this necessary up-to-date efficient equipment.



Robins Timken Troughing Idler

ROBINS BELT CONVEYORS

The belt is of our own make exactly suited to the service. The idlers are unique having "one-shot" lubrication, automatic adjustment of roller bearings, perfected grease seals that do not leak either way and a construction that is practically indestructible.

ROBINS SCREENS

The GYREX and VIBREX are so well known and highly regarded in the industry that their selection is a natural step in plant improvement. The GYREX screen is offered in more than 100 variations of size, style, stroke and speed. Equipped with SUPER GYRALOY wire mesh, the longest lasting screen cloth yet produced.

Robins Gyrex Screen

A Robins Equipped Stone Plant

ROBINS PLANTS

Many of this country's aggregate producers have learned from experience that a ROBINS plant either large or small is an economical plant. First cost is surprisingly low and maintenance cost is almost non-existent.

ROBINS CONVEYING BELT COMPANY

15 PARK ROW, NEW YORK • OLD COLONY BLDG., CHICAGO

Boston Charleston, W. Va. Cleveland Detroit

Philadelphia Pittsburgh London Johannesburg

Representatives in other principal cities

MATERIAL HANDLING ROBINS EQUIPMENT

Will you do us a favor?

Just check these three questions ...then

TEAR AND MAIL

WE are making an analysis of our past sales effort on Tru-Lay Preformed Wire Rope. We would appreciate your frank co-operation in this effort, for which we will gladly reciprocate at any time.

Less than ten years ago we announced the manufacture of a new wire rope, its wires and strands preformed to the shape and position they would occupy in the finished rope—thus eliminating internal stress and strain. Thousands of service records have proven that this manufacturing process has added materially to the life of the wire rope.

The sales goal set at that time has already been exceeded by a wide margin—a source of great satisfaction to me. We want to do an even better job, which must be based on intelligent sales analysis. Will you help us by placing a check mark before the questions in the coupon to the left? Then tear and mail.

To assist you, the opposite page carries a few of the advertisements which have appeared on Tru-Lay Preformed Wire Rope. Thank you! Of course, I would appreciate it if you cared to write me personally.

Yours very truly,
AMERICAN CABLE COMPANY, *Inc.*

G. O. Moon
VICE-PRESIDENT

AMERICAN CABLE COMPANY, Inc.
Wilkes-Barre, Pennsylvania

Yes ☐ **No** ☐ Has our advertising in PIT & QUARRY interested you in Tru-Lay Preformed Wire Rope?

Yes ☐ **No** ☐ Has our advertising in some other publication interested or influenced you *more* than it did in PIT & QUARRY

Yes ☐ **No** ☐ Has our advertising helped you understand why the preformed principle adds materially to the life of wire rope, as proven by thousands of service records?

(Additional comments by letter would be appreciated, including name of publication other than PIT & QUARRY if your answer is "Yes" to second question)

You have seen these advertisements in this publication

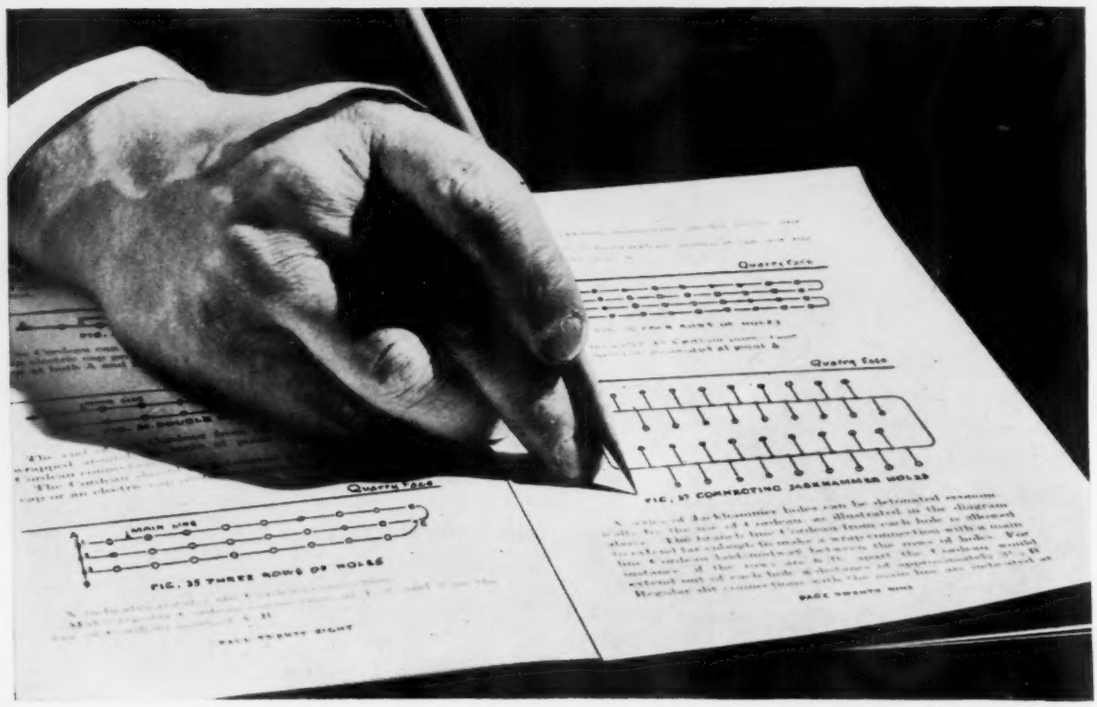
Your Name.....

Firm Name.....

City..... **State**.....

THANK YOU!

FATIGUE
TRU-LAY PREFORMED RESISTS FATIGUE
SO IT IS WITH WIRE ROPE THAT IS NOT PREFORMED
NOTE THAT END REQUIRES NO SEIZING
TRU-LAY Preformed Wire Rope Resists Fatigue Resulting in 30% to 300% Increased Service
PERFECT CO-ORDINATION MAKES A CHAMPION
...LIKEWISE IN TRU-LAY PREFORMED WIRE ROPE
THE OLD
THE NEW
AMERICAN CABLE COMPANY, Inc.
TRY WRITING LIKE THIS...
THEN RELAX AND WRITE
NON-PREFORMED
WHY WE MANUFACTURE AND RECOMMEND PREFORMED WIRE ROPE
The NEW Preformed
The OLD Preformed
REFUSE TO BE BLINDFOLDED BY TRADITION
Demand TRU-LAY Preformed Wire Rope!
Save money...you get much longer service with TRU-LAY PREFORMED WIRE ROPE
When they take THEIR "Make-up" off



Yes! *it can be profitable to hook up jackhammer holes with* Cordeau-

Pass one end of the Cordeau-Bickford Detonating Fuse through a cartridge and drop to the bottom of the hole. Load and tamp. Connect each hole as shown by making wrap connections with the main lines of Cordeau, laid midway between the rows of holes. Cap the end of the main line with an EB Cap or Fuse Cap—and fire all the holes at one time.

There is no limit to the number of holes that can be connected at one time.

Each load will have added force because every cartridge will be in contact with the detonating agent. This means more work from your explosives, better blasting. And the fact that Cordeau is an *insensitive* detonator, brings other important advantages.

There is a new technique in blasting, which brings new economies to operators everywhere. It is explained and illustrated in the Cordeau Book—free to executives.

CORDEAU
DETONATING FUSE
BICKFORD

SAFETY FUSE *and* LIGHTERS

Ensign-Bickford Safety Fuse is available in a number of standardized brands, each carefully made for a particular set of conditions. The use of Safety Fuse simplifies blasting technique.

Also—there are a number of Ensign-Bickford lighters, inexpensive—and positive in action.

CB26

THE ENSIGN-BICKFORD COMPANY, Simsbury, Connecticut

THE 1934 HANDBOOK WILL BE READY SOON

How—

—much do you know about your prospects
—accurate and complete are your prospect lists
—many "not there" calls do your men make
—much do you waste per year on poor lists
—much do you know about new developments

?

The pit and quarry industries are more active now than they have been in years. In fact, it's one of the most active fields in industry. It's natural. For before the roads, dams, bridges, buildings, etc., can be built under the public works program the raw material has to be furnished.

Get your share of it. Don't miss fire with poor prospect lists. Don't lose sales because you had "never heard of that fellow before."

These lists are the most complete ever published. They contain hundreds of new names. They have been completely revised—all listings have been brought up to the minute.

Regardless of whether your territory covers only one state or the whole country the investment in a copy of Pit and Quarry Handbook is something that will pay big dividends—in sales.

Get Started Now—The Field Is ACTIVE—It Is BUYING—Order This Selling Helper Today

---

PIT AND QUARRY
538 S. Clark St.
Chicago, Ill.

As Soon As Published:

☐ Send ..... copies of the 1934 Pit and Quarry Handbook and Directory ($10.00 per copy).

☐ Send ..... copies of the separately bound Pit and Quarry Directory ($10.00 per copy).

☐ Remittance Enclosed. ☐ Will Remit Promptly on Receipt of Invoice.

My Name ..... Title .....

Firm .....

Address .....

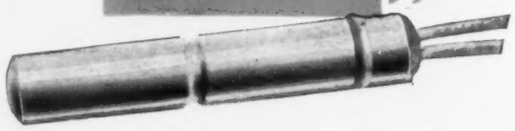
First!

Some of the Important and Widely accepted developments pioneered and popularized by ATLAS

First **ATLAS Accordion Fold** 1933

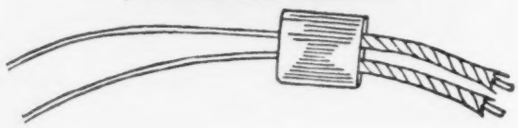
PACKAGING of individual electric blasting caps. The package is compact, handy to carry and easy to open. It protects the detonator from external shock, keeps wires folded accordion-wise so that they may be straightened without tangles and permit easy priming. 1933—Reg. and Patent Applied For.

First **ATLAS All-metal Closed Shell Electric Squib** 1930



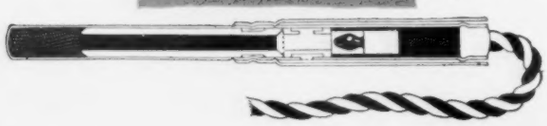
NO HOLE in shell. Auxiliary flash composition. The powerful flame it generates insures positive ignition of Black Powder, Blakstix or Pellet Powder. The closed metal shell prevents the flame-producing compounds from absorbing moisture. Patented Features.

First **ATLAS Metal Shunt Attachment** 1925



AN IMPORTANT metallic, protective device that short circuits the bare ends of the leg wires of Atlas Electric Blasting Caps and Electric Squibs and guards against firing from accidental contact with conductors carrying stray currents. Patented Features.

First **ATLAS All-metal Delay Electric Blasting Cap** 1928



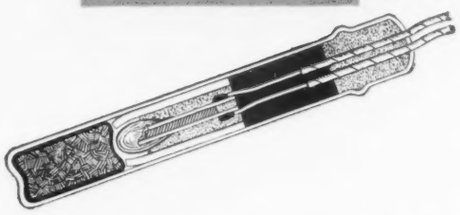
THE ORIGINAL all-metal type. No rubber tube. No fuse. Resistant to moisture and water pressure. Flame filter and baffle. Unequalled accuracy of timing. Patented Features.

ATLAS POWDER COMPANY
A proper explosive for every blasting requirement
WILMINGTON • DELAWARE
Cable Address—ATPOWCO

ATLAS EXPLOSIVES

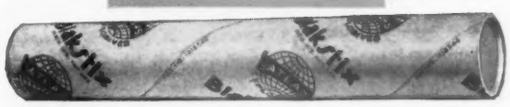
You bought these FIRST from ATLAS

First **ATLAS Match-head Type Electric Blasting Caps** 1919



ATLAS MATCH-HEAD type Electric Blasting Caps by reason of unique design and method of manufacture establish new standards of simultaneous firing. All pressed detonating charges insure maximum detonating action. The flash composition is firmly shrunk around the bridge resistance wire to insure intimate contact. Efficient insulation of the Match-head assembly is provided. Patented Features.

First **ATLAS Blakstix** 1932



THE GREAT advance in black powder. Blakstix is an aerated form of Black Powder which provides a stressing action which reduces checking and crumbling and produces more lump and prepared sizes of coal. Less smoke, less fumes. A new powder. A new action. It pushes! Patented, and Trade Mark Registered.

First **ATLAS Apex** 1932

THE NEW TYPE quarry explosive is another advance in controlled force to stress burdens and cause favorable breakage and fragmentation. Varying strengths (grades) are available to meet varying conditions. Apex pulls more yards, permits increased spacing to save drilling costs and produces increased tonnage of rock per pound of explosives used. The patented moisture-proof cartridge permits the utilization of these ideal formulas.

First **Efficient Shunt Wound ATLAS Blasting Machines** Rackbar Type 1920 Dynamo Type 1925

EARLY IN 1920 Atlas introduced to the trade the first correctly designed shunt wound rackbar type blasting machine which is now accepted as standard.

In 1925 Atlas introduced to the trade the first dynamo type, key-operated blasting machine which has now almost entirely replaced the old magneto type. The Atlas No. 2 Special Blasting Machine excels in capacity, durability and appearance. Efficient blasting machines have contributed greatly to the success and development of electric blasting and modern explosives control.

ATLAS EXPLOSIVES

BRANCH OFFICES:
Allentown, Pa.; Boston, Mass.; Denver, Colo.; Houghton, Mich.; Joplin, Mo.; Kansas City, Mo.; Knoxville, Tenn.; Memphis, Tenn.; New Orleans, La.; New York, N. Y.; Norristown, Pa.; Philadelphia, Pa.; Pittsburg, Kansas; Pittsburgh, Pa.; St. Louis, Mo.; Tamaqua, Pa.; Wilkes-Barre, Pa.

Diamond Dredge Pump. Simplicity of design and sturdiness of construction plus the new "Wear Resister" insure maximum durability.

The New WEAR RESISTER!

● is making history in Pump Economy

COMING on the heels of a long line of improvements, the P. M. Co. "Wear Resister" is the sensational development of today in modern dredge pump design. It is far-reaching in its economic effect because it goes to the root of pump troubles—*destructive abrasion* at vital points.

Heretofore, the handling of sharp sand and hard gravel has worked havoc with pump parts. Veteran dredge line operators had no illusions about the service life of the average dredge pump. They knew that it would not give much yardage, and they took heavy replacement costs for granted.

All that has been changed by this signal achievement of P. M. Co. engineers. The punishment that Diamond Dredge Pumps can take on the job will revise your ideas of pump performance. They are not only "built tough" with all wearing parts, made of Diamond Manganese Steel—they are also insured against abrasion with the "Wear Resister." This protects the pump shell, side plates and liners from wear, at vital points, and vastly increases pump life.

Write for further information on Diamond Dredge Pumps—their advanced features mean reduced costs. Built in all sizes for handling sand, gravel, slurry and all kinds of sludge.

THE WEAR RESISTER IS ADAPTABLE TO YOUR INSTALLATION

Patents applied for

This exclusive feature of Diamond Dredge Pumps

- **prolongs pump life**
- **reduces costly shutdowns**
- **cuts down repair costs**
- **steps up production**

PETTIBONE MULLIKEN CO.

DIAMOND Est. 1880

4710 West Division Street CHICAGO, ILLINOIS

P. M. Co. Products include Traveling Chain Cutters, Rotary Cutters, Elbows, Flap valves, Nipples, Jaw Plates, Crusher Parts, Dippers, Dipper Teeth, Bucket Lips, Sheaves, and many other Manganese Steel Products.

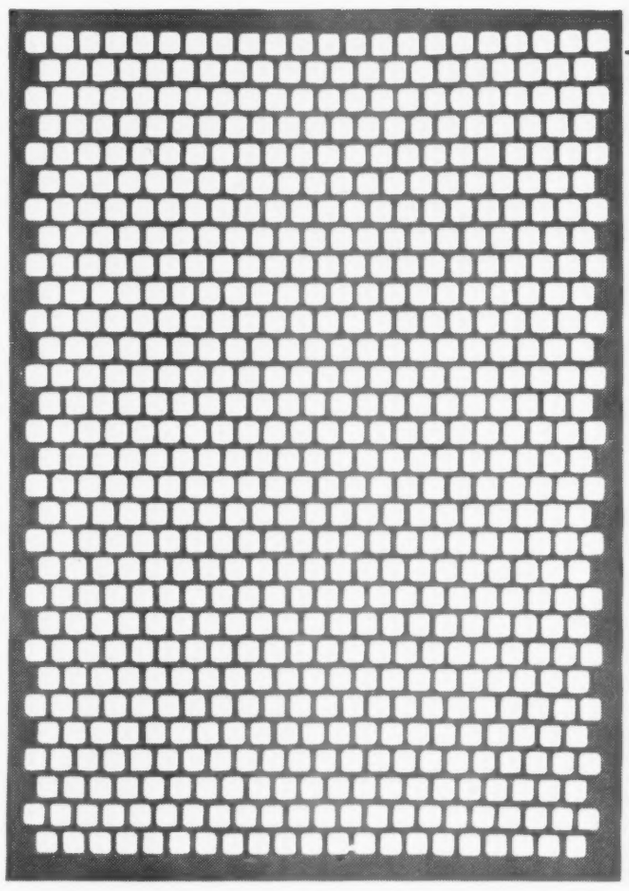
Announcing
"SQROUND MESH"
—Something New and Better in Perforated Plate

A square opening 1¼" will pass oversize material because the diagonal dimension is 1¾".

A round opening 1½" diameter (which is equivalent to 1¼" *square* opening) will give greater accuracy but not sufficient capacity.

"Sqround Mesh"—a new Hendrick development—combines the good features of round and square mesh. It eliminates the oversize which goes through the diagonal dimension of a square mesh because the distance between the fillets in the corners of "Sqround Mesh" is the same as the diameter of an equivalent round mesh.

"Sqround Mesh" can be furnished in any size mesh required, in either flat plates or in double corrugated plate, also a Hendrick development. Write for complete data.



HENDRICK MANUFACTURING CO.

39 Dundaff Street, Carbondale, Pa.

Baltimore Birmingham Boston Cincinnati Cleveland
Detroit Hazleton New York Philadelphia Pittsburgh

THE SPIRIT OF ACHIEVEMENT

Thermoid Products are engineered with the same spirit of achievement that makes possible the world's great water-power developments.

Every Thermoid product is an engineering accomplishment as *sound*, if not as *spectacular*, as the project uppermost in the minds of the public at any given time. Knowledge, skill and experience of demonstrated dependability are reflected in the service of Thermoid belting, hose and packings—as surely as they are reflected in the more impressive achievements that "make the front page" of the nation's press. That is why Thermoid products serve well — serve economically — serve long!

Every product that bears the Thermoid name is *engineered* for the job—and *field tested* for a definite, accurate measure of performance under *all* conditions. The Thermoid trade-mark on mechanical rubber goods is no mere identification of a belt, a hose, a packing. It *is* the mark by which an *actual engineering achievement* may be recognized! *Buy by that quality mark!*

THERMOID RUBBER COMPANY

Factories and Main Offices:

TRENTON, NEW JERSEY

Thermoid

Thermoid MECHANICAL RUBBER GOODS

A striking photographic study made by Rittase of the spillway at the great Conowingo Dam

BELTING

HOSE and PACKINGS

These NEW Bulletins . . .

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Above: Latest model Cedar Rapids Traveling Plant.
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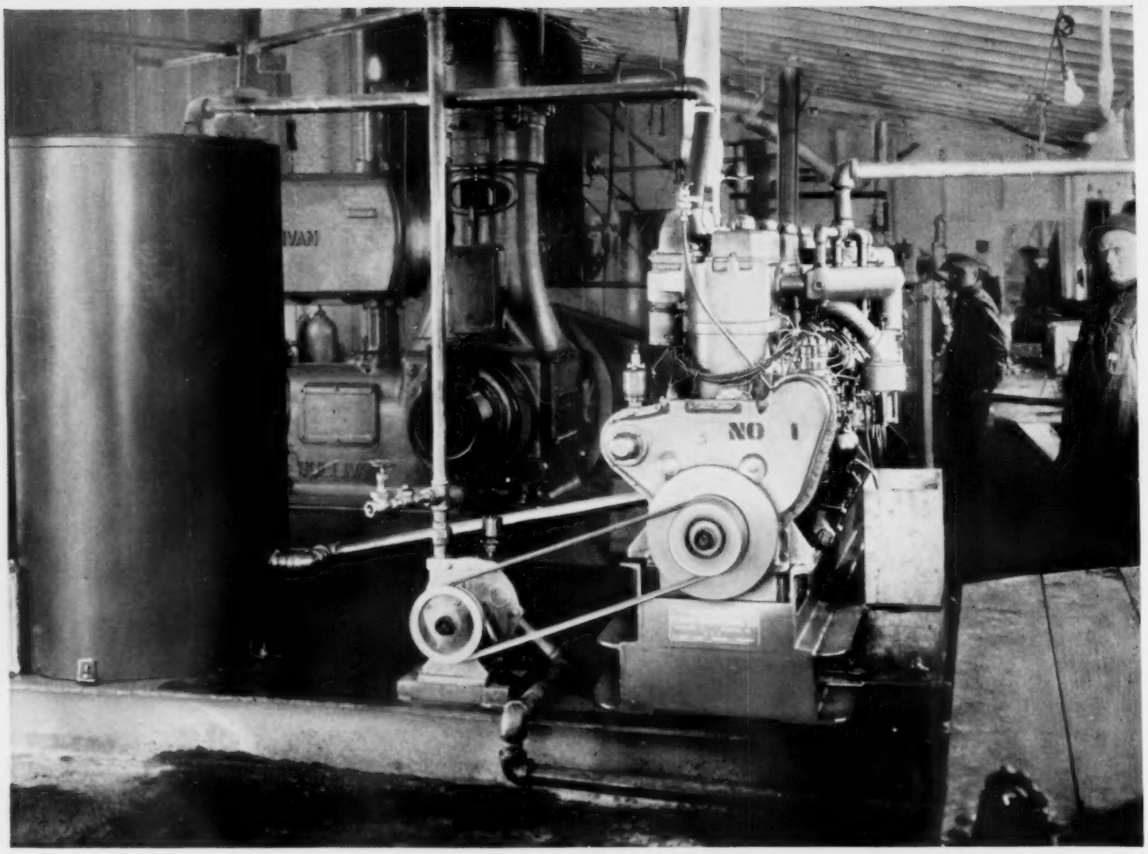

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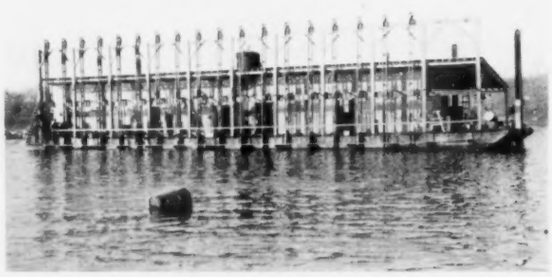
The latest example is the Al Johnson Construction Company's radically new drill boat, now widening the Mississippi channel below Davenport. Here fuel economy and also dependability are important, for the two Blue Streaks and two Sullivan Angle Compound Compressors operate at a higher load factor than on any drill boat heretofore; eighteen drills put in 5-foot holes on 5-foot centers along a 15,000-foot stretch, and 20-hour-per-day operation is demanded, and secured.

Today and hereafter, equipment purchases must be made more than ever on the basis of *fuel economy* as well as long life and low maintenance, for it must be recognized that the cost of high-priced fuel can soon over-balance the cost of the engine. Beware of wasteful *new* equipment! On present and future jobs, get the Blue Streak facts first! CLIMAX ENGINEERING COMPANY, 111 West Monroe St., Chicago.



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WRITE TODAY for proof of startling economy of Sealdrok Automatic Asphalt Plant. Let us send you the facts . . . how you can ***increase your profit a dollar or more a ton.***

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Sealdrok Cold-lay Asphalt Paving on Route 6 near Dixon, Illinois.

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Power economies up to 30% and 40% are made by plants using the Hydroseal Dredge Pump, and in order to make these power economies sure, no matter what the installation conditions may be, we have simplified its design and made its power saving operation fool-proof . . . The same Hydroseal principle of introducing clear water on each side of the impeller (see diagram) still produces efficiencies of 50% or more, and prevents abrasive wear between the impeller and pump side plates . . . Among the numerous new improvements is the use of our new rubber mixture, which we call "Maxamix", for the Automatic Seals. This was developed specially for dredging conditions and it will far outlast even the impeller . . . Write for complete information about the NEW Hydroseal Pump, for its new design alone will convince you how it will pay for itself in a few months' time. The Allen-Sherman-Hoff Company, 223 South 15th Street, Philadelphia, Pennsylvania. Offices in all principal cities.

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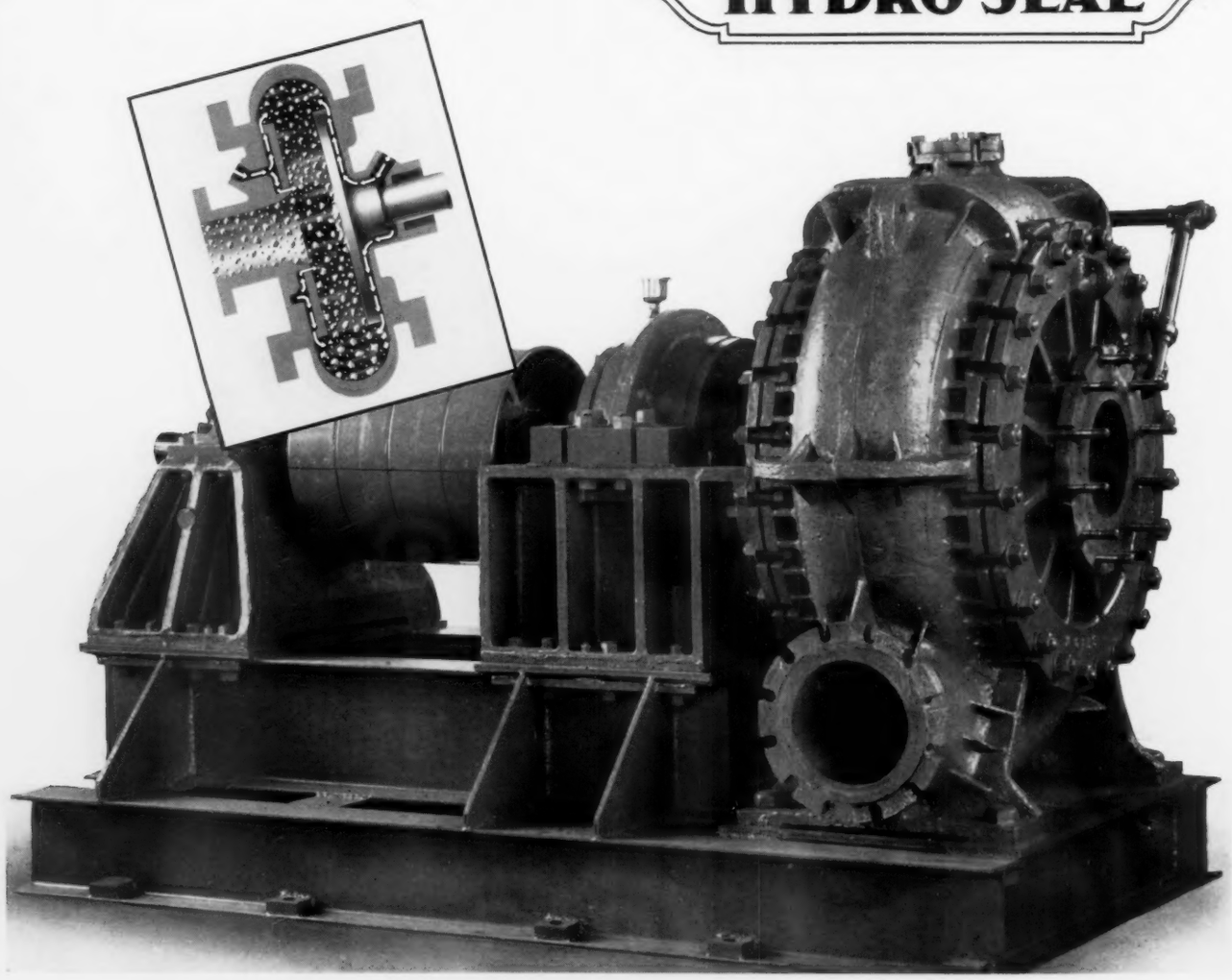


VOLUME 26 NUMBER 8

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, FEBRUARY, 1934

Road-Builders Urge Adequate Road Plan

100 MACHINERY MAKERS EXHIBIT

The 31st Annual Convention and Highway Exhibit of the American Road Builders' Assn. was held January 22-25, 1934, at the Stevens Hotel, Chicago, Ill. The highway exhibit was, as usual, one of the feature attractions and more than 100 manufacturers displayed road machinery and equipment, trucks, highway materials, etc. Resolutions were adopted which form the basis for an aggressive national campaign of the association for properly planned and adequately-financed programs for the improvement and maintenance of the highways of the United States.

The resolutions proposed:

1. An additional federal highway appropriation of $400,000,000 for the fiscal year 1935.
2. The restoration of appropriations for routine federal aid to be matched by the states.
3. Long-range advance planning of governmental construction projects.
4. The use of gasoline-tax and motor-vehicle revenue for highways only.
5. Liberalization of terms for loans and grants to cities and counties on non-federal public-works projects under the P. W. A.

Gravel Plant for Montana Dam Under Construction

★ J. L. Shiely, sand and gravel and ready-mixed concrete producer of St. Paul, Minn., is proceeding with the construction of a 100-ton per hr. capacity sand and gravel plant to furnish aggregates for the construction of the Fort Peck Dam in Montana. A 1½-cu. yd. Sauerman Crescent scraper, a Waukesha-Hesselman 90-hp. oil engine, and Link-Belt conveying and screening equipment have been purchased for this plant which will go into operation early in March.

Ickes Threatens to Build Tennessee Cement Plant

Harold L. Ickes, secretary of the interior and public works administrator, recently made the statement that the present "high cost" of cement may drive the federal government into the cement business and is one of the reasons for the delay in the public works program. He also stated that cement could be made in the Tennessee Valley and that it would be a very good project for a subsistance homestead. The section of the cement code forbidding the erection of new plants, he believed, would not apply to government manufacture. In commenting on Secretary Ickes' statements, cement manufacturers in that district stated that the existing price of cement does not allow of profitable operation on the present volume of business.

T. V. A. Lets Contracts for Norris Dam Stone Plant

★ The Tennessee Valley Authority has awarded contracts amounting to about $80,000.00 for equipment for the rock crushing and screening plant under construction which will supply aggregates for the Norris Dam near Knoxville, Tenn. Awards for a sand-manufacturing plant have not yet been placed. Contracts awarded include the following: Allis-Chalmers Mfg. Co., a crusher and screen; Nordberg Mfg. Co., a Symons cone crusher; Robins Conveying Belt Co., screens, conveyors and belting; Niagara Concrete Mixer Co., sizing screens; Stephens-Adamson Mfg. Co., sizing screens; Jeffrey Mfg. Co., feeder.

★ The Consumers Co., Chicago, Ill., has installed two new 3-deck heavy-duty Productive Equipment Co. Jigger vibrating screens in its plant at Libertyville, Ill.

★ The Lenawee Sand & Gravel Co., Tecumseh, Mich., recently installed a new 48-in. three-cone Allswede rotary scrubber.

★ New electric equipment has been installed in the plant of the Modern Sand & Gravel Co., Pacific, Mo., replacing a steam engine formerly used. The company is owned by the Stiers Construction Co., St. Louis, Mo.

★ The Ideal Sand & Gravel Co., Mason City, Ia., is reported to be going ahead with its plans for the addition of new washing and screening equipment and for a general rearrangement of its plant.

★ The Santa Cruz Portland Cement Co., Davenport, Cal., has installed a new automatic scale for weighing out carload shipments of cement.

Many Cement Plants Reopen for Season

EXPECT AN INCREASED DEMAND

The unusually early resumption of operations by many Portland-cement plants continues to indicate the optimism of producers for the coming season. Since the last issue the following plants are reported to have resumed operations: Universal Atlas Cement Co., Hannibal, Mo., and Hudson, N. Y.; Lawrence Portland Cement Co., Northampton, Pa.; Dewey Portland Cement Co., Dewey, Okla.; Pittsburgh Plate Glass Co., Columbia Cement Division, Zanesville, O.; North American Cement Corp., Alsen, N. Y. Other plants scheduled to reopen include the Signal Mountain Portland Cement Co., Chattanooga, Tenn.

Lime Producer Installs Screens and Separator

★ The Mississippi Lime & Material Co., Alton, Ill., recently purchased two new Niagara vibrating screens, one a 4-ft. by 16-ft. triple-deck screen and the other a 4-ft. by 14-ft. double-deck unit. A 12-ft. Raymond mechanical air separator used on hydrated lime in connection with a regular throwout mill has recently been installed at the company's plant at St. Genevieve, Mo.

New York State Stone Group Holds Meeting

The New York State Crushed Stone Assn. held its annual meeting on Jan. 12 at the Syracuse Hotel, Syracuse, N. Y. Many subjects were discussed, among the most important being the new state specifications. The following officers were elected: President, J. E. Cushing, Cushing Stone Co., Schenectady, N. Y.; vice-president, Wilson P. Foss, Jr., New York Trap Rock Corp., New York, N. Y.; secretary and treasurer, George E. Schaefer, General Crushed Stone Co., Rochester, N. Y. The annual banquet was held in the evening.

★ The Neal Gravel Co., Mattoon, Ill., is rebuilding its plant at Attica. Two revolving screens are being replaced by one Productive Equipment Co. Jigger vibrating screen.

Johnson Temporarily Halts Cement Code

ARTICLE XI WIDELY ATTACKED

An order issued January 23 by Administrator Hugh S. Johnson has suspended practically all of Article XI of the cement code.

The suspension, which followed a public hearing in Washington Jan. 15 and 16, remains in effect until such time as modifications, to be submitted by the code authority to the Administrator are approved by him. The modifications, however, will not become effective until after a further public hearing at which they may be discussed.

The exemption order was issued upon the recommendation of Division Administrator W. A. Harriman, who was joined by Deputy Administrator Barton W. Murray, N. R. A. member of the code authority for the cement industry.

With the order in effect the only provisions of Article XI which are now applicable to the industry are those which prohibit discrimination in prices, terms and conditions of sale at the same time and place of delivery between purchasers or users of cement in the same class and similarly situated, and Section 4 of Article XI, which relates to the method of marketing cement.

The text of Administrator Johnson's order follows:

"A code of fair competition for the cement industry was approved by the President on Nov. 27, 1933.

"Applications having been duly made by interested parties for an exception to, exemption from and modification of the provisions of Article XI of the said code, hearings having been held thereon on the 15th and 16th day of January, 1934, the Deputy Administrator having rendered his report and recommendations thereon, which report and recommendations are hereby adopted and approved, and it appearing to me that conditions and circumstances indicate that Sec. 1, 2, 3, 5, 6, 7, 8, and 9 of the said Article XI require modification in order to effectuate the policy and provisions of Title I of the National Industrial Recovery Act;

"Now, Therefore, I, Hugh S. Johnson, pursuant to the authority vested in me by the provisions of Article XI of the said code, and by the Executive Orders dated July 15, 1933, and Dec. 30, 1933, and otherwise, hereby exempt and except all members of the cement industry from the operation of the aforesaid sections of Article XI of the said code until such time as the code authority for the cement industry submits for my approval modification of the aforesaid sections and until such time as such modifications, after due notice and hearing, have been approved by me."

Modification of Article XI, dealing with the method of selling and marketing, was urged by building-material dealers from all over the country at the hearing of Jan. 15 before Assistant Deputy Administrator B. R. Value. The hearing was held chiefly to hear the protests of the cement dealers that the code as written permits certain groups of contractors working on jobs not entirely within the limits of cities, towns or villages, to purchase cement directly from the producers, resulting in considerable loss of business to them.

Speaking for the Associated General Contractors of America (A. G. C.), in favor of the retention of the disputed article, N. F. Helmers, a member of the firm of Sieme-Helmers, Inc., of St. Louis, said that local organizations of contractors had fought against the establishment of a mandatory dealer discount for years before the A. G. C. was launched to protect the interests of contractors against such inroads "into the rights of contractors as buyers and consumers of this and other material."

Charging that "dealer collusion" prevented the establishment of fair trade practices in the distribution of cement until the time that all cement manufacturers could act together to discontinue the abuses of the mandatory differential practice, he said, "the mandatory dealer differential was in the process of abandonment by cement companies during such peak years as 1927 and 1928, some manufacturers definitely abandoning the dealer differential altogether on projects located outside cities and towns in this period."

"It would be the rankest sort of injustice to allow the dealer monopoly to extend outside municipal limits," Mr. Helmer said.

Arguing against this stand, C. C. Cook, president of the National Federation of Builders' Supply Associations, declared that the code, if permitted to stand as it was written, would menace the security of more than 350,000 people who are either employees of, or investors in, the material-supply business.

The disputed clause under Article XI of the cement-industry code, as approved by the President, states that "the following buyers shall be sold direct by members of the industry at the same price and under the same conditions and terms of sales as to dealers":

United States Government, state governments, counties, and parishes when properly authorized to purchase cement for public improvements or maintenance.

Contractors doing any of the foregoing classes of work, except where such work is located entirely within cities, towns, or villages.

Railroads filing tariffs with state or interstate commissions, and contractors doing work for such railroads.

Owners or contractors buying for power development, flood control, and water-supply projects that do not require dealer service.

Concrete-products manufacturers, including block, tile, roofing, pipe, piling, and all other precast concrete units when for their own manufacturing operation, but not for resale.

Commercial concrete-mixing plants for their own processing operations, but not for resale.

Stating that they "understand" that the building-supply dealers also object to their being included in this clause, Benjamin Wilk presented a brief to the Assistant Deputy in charge of the hearing, on behalf of the manufacturers of cement products, urging the retention of the original clause.

"Such manufacturers," he said, "are equipped to handle cement in large quantities, as most of the larger plants have adequate sidings and storage facilities. In such cases where a products manufacturer does not have the necessary facilities and a dealer renders a service to the products manufacturer by handling the cement, we certainly feel that the dealer is entitled to a differential based on the service that he gives. We strenuously object, however, to being required to pay a differential where the dealer does not render a service."

The dealers contended that the operation of the code with this clause written into it would decrease the consumption of cement by making the cost of less-than-carload lots prohibitive. To cover the large capital investment that they have made in yards and storage facilities it would be necessary, they claimed, to increase the cost of cement to consumers of small quantities, such as home builders and home owners planning repairs and renovations that would require the use of cement.

A strong point was made in the favor of the dealers when W. E. Cox, assistant attorney general of Illinois, added his objection to the code as written, claiming that the clause under discussion prevented his state from contracting for a year's supply of cement at one time. He contended that the only way in which the state could purchase this quantity of cement would be through the services of a dealer, and that the mandatory clause in the code prevented its doing this.

D. S. Colburn, representing the Marquette Cement Mfg. Co., of Chicago, added his protest against the clause to that of the cement dealers, and requested a modification of the objectionable section of the code.

It was stated by E. A. Lockett, vice-president of the Los Angeles County Building Material Dealers' Assn., that he had discussed the code with cement manufacturers in Los Angeles County and that they had agreed it was not to their liking. He asserted that cement mills in the West had nothing to do with formulating the code and charged that it was drawn up by an "organized minority" which had conspired to take away from the dealer the "cream" of his business. He expressed his belief that the mills had no moral right to take away from dealers something which the latter had created.

On the other hand, Charles F. Ho-

(Continued on page 37)

Permissive Area Clause Not Voided by N. R. A.

RUMORS OF ACTION UNFOUNDED

Applications have been received by the National Recovery Administration asking to set up permissive areas under Sec. 5, Article VII, of the aggregates code in Tennessee and in Georgia, which would prohibit the introduction of any new facilities into those areas.

The fact that the Industrial Advisory Board of the N. R. A. has not taken action on these applications has given rise to rumors that the board has recommended the suspension of the "permissive area" clause in the code. This rumor was denied on Feb. 8 by Sullivan W. Jones, a member of the board, who said that the worst interpretation had been placed on their action in withholding their approval on the applications.

The board's refusal to act was based on the fact that it did not feel that sufficient information had been set forth as to the necessity of such action. This stand was taken particularly in view of the fact that the applications would set up areas comprising nearly the whole states in both cases. Mr. Jones said that there may be conditions where such action may be justified, but that the fact that that condition existed would have to be ascertained by an impartial survey.

While the Industrial Advisory Board in a general way disapproves the idea of setting up permissive areas, it has no intention of attempting to have that clause stricken from the codes. Its disapproval of the idea arises from the fact that it feels that no industry should be nursed along to the extent that there is a possibility that the industry would lose its own sense of initiative. However, as in the case of the aggregates industries, in which there is such an overwhelming surplus of both material and plants, such action might be deemed advisable.

The setting up of such areas would practically prohibit contractors outside the area from bidding on jobs, particularly road jobs, within the area. It would take such contractors so long, three weeks at least, and perhaps longer, to gain permission from the Code Authority and the Administrator to move their portable plants into the permissive area, that it would be useless for them even to bid on such jobs.

In both instances where permission has been asked to set up such areas, the application has come from the members of the industry within the affected area. Furthermore the surveys upon which the applications have been based, and the figures supporting the applications, have been made by those who seek the protection that would be afforded by the setting up of permissive areas. This fact has tended to make the board skeptical of the need of such action and suspicious of whether or not it is merely a subterfuge to alleviate competition. The board feels that such a survey should be made by impartial engineers, and if the resulting figures should show the need for it, then it feels that such action would be justified.

The Code Authority of the aggregate industries was expected to be in Washington the week of Feb. 12 at which time the matter was to have been gone into more fully.

State Committee Would Make Illinois Permissive

The entire state of Illinois will be made a "permissive area," if a resolution, approved at a meeting of the Illinois State Committee of the Code of Fair Competition for the crushed-stone, sand-and-gravel and slag industries held at Champaign, Ill., on Jan. 8, receives government sanction. This resolution is in the nature of a recommendation to the Regional Committee of Region 9, which will transmit one copy of it and the findings supporting it to the Code Authority and another copy to the government administrator assigned to these industries. To become effective the findings of the committee must be approved by the administrator. Meanwhile, following the committee's recommendation, the Regional Committee may require, "subject to review and disapproval by the Administrator, that before a new plant is installed or the producing capacity of an existing plant increased within any permissive area, notice of such intent shall be filed with the regional committee of the region in which such action is contemplated," as is provided in Sec. 5 (c) of Article VII of the code. (See PIT AND QUARRY, December, 1933, p. 28.)

Fourth Region Elects Local Committee Heads

The districts of Region 4 have chosen the officers of their district officers. Their names, as given out by A. M. Parker, secretary, Fourth Regional Committee, follow:

DISTRICT OF COLUMBIA

W. A. Smoot, Smoot Sand & Gravel Corp., Washington, D. C.; chairman.
P. Y. K. Howat, The Capital Materials Co., Washington, D. C.; vice-chairman.
E. A. Scheele, Smoot Sand & Gravel Corp., Washington, D. C.; secretary and treasurer.

MARYLAND

Walter Stauffer, J. E. Baker Co., York, Pa.; chairman.
J. J. Hock, The Arundel Corp., Baltimore, Md.; vice-chairman.
J. I. Palmore, Jr., Baltimore, Md.; executive secretary.

VIRGINIA

John W. Stull, Liberty Limestone Corp., Rocky Point, Va.; chairman.
Thomas Whyte, Friend Sand & Gravel Co., Inc., Petersburg, Va.; vice-chairman.
David Alexander, Dixie Sand & Gravel Corp., Petersburg, Va.; secretary.

WEST VIRGINIA

F. R. Dunlap, Hinton, W. Va.; chairman.
H. G. Truslow, Charleston, W. Va.; vice-chairman.
P. J. Walsh, Charleston, W. Va.; secretary-treasurer.

December Construction Ahead of November's

GAIN IS 28% IN 37 STATES

The consecutive monthly gains in construction contracts recorded since July, 1933, were continued into December, quite ignoring the seasonal tendencies customary during the period. The contract total reported in December by F. W. Dodge Corp. covering the 37 eastern states amounted to $207,209,500; this was an increase of approximately 28 per cent. over the November total which itself registered a gain of almost 12 per cent. over October. In fact, the total for the final month of 1933 was larger than that recorded for any other month since October, 1931, and was more than 2½ times as large as the contract volume recorded for December, 1932.

Of the December contract total $155,862,800 was for publicly-financed construction while the remaining total of $51,346,700 was for privately-financed undertakings. Publicly-financed construction contracts during December were almost nine times as large as the total for this class of work shown during April when such construction contracts were at their lowest point. Privately-financed contracts let during December were higher than for any month since April, 1932, with but four exceptions during the summer of 1933. Commenting on this situation the Dodge organization observes:

"This condition affords encouragement for the near future since usually it is private building activity that provides a basis for a sustained recovery in construction and business generally."

Construction contracts awarded in the 37 states during the full year 1933 amounted to $1,255,708,400 as contrasted with the total of $1,351,158,700 for 1932; this, it is seen, is a decline of about 7 per cent. between the two years. For the first half of 1933, contracts were running 35 per cent. behind the corresponding period of 1932; thus it is clear that during the final half of the year a considerable speeding up in contracts took place even though such improvement was not quite sufficient to offset completely the loss recorded during the initial half.

Residential building contracts awarded in 1933 totaled $249.262.100; this was a decline of 11 per cent. from the total of $280 067 900 reported in 1932. Non-residential building contracts awarded during 1933 amounted to $403 712.700; this was a loss of 16 per cent. from the total of $480.789.600 reported for 1932. Contracts for public works of the engineering types totaled $499,517,800 in 1933. This was within 3 per cent. of the total of $514 - 699.700 reported for these types during 1932. Awards for public utilities let during 1933 amounted to $103.204 - 800. This was a gain of almost 37 per cent. over the total of $75,601,500 reported in 1932.

Editorial

Is Production for Profit Doomed?

AMONG people at large there is a good deal of discussion these days of subjects which were rarely mentioned outside academic circles a year or two ago. The intrusion of government in business in the interest of the ordinary man, particularly as exemplified by the theory and the practice of the National Industrial Recovery Act's provisions, has brought many persons face to face with the practical problems of economics as affecting everyday life and has made them conscious for the first time of the far-reaching social effects of the profit motive in business.

Dishonesty in public life, both business and political, has long been a topic of jocular conversation, and as long as that situation vaguely described as "general conditions" was satisfactory to the average man there was little serious complaint except among the naturally critical. Ordinary people were ready to condone dishonesty in others as long as their own chances of profiting by similar "strokes of genius" were not destroyed. A good-natured give-and-take *camaraderie* existed between pilferers large and small, and a bond of natural sympathy developed between the worker who could extort fifteen dollars for a day's labor and the captain of industry who could raise a million dollars on worthless paper. There grew up a general and easy tolerance for tricky and even illegal practices and a readiness to pardon the "offender" against Puritanical ethics in pecuniary transactions. Business men and business policies were judged most often by the degree of "success' that they produced; there was little desire to scrutinize their methods.

Until the crash of the last few years this mutual forgiveness of sin had a good sportsmanship and genial affability about it which commended it to those who like to be known as "good fellows." However, in the weighing of gains and losses which followed that catastrophe a great disparity in the distribution of rewards became apparent to the "common" man and there began that chorus of lamentation and mutual crimination and recrimination which has lately filled the press and all but monopolized serious discourse. As was to have been expected, those who were glad to be companions in knavery were unwilling to be partners in adversity. The malfeasances of business men have raised such an uproar and have presented such a seemingly hopeless confusion of principles and purposes, responsibility and punishment, that even the fundamental theory of business enterprise, the profit motive, to which every one was apparently contentedly committed, is being subjected to critical and none-too-favorable examination by the man in the street. Indeed, one might gather from the discussions one hears in clubs, Pullman smoking-rooms, and saloons (where these are again legal) that the end of profit-taking has arrived and that we are only one step short of state socialism. So we feel guilty of no alarm-ringing or crystal-gazing when we ask, in all seriousness, "Is production for profit doomed?"

Yet all these things were inevitable, both the irregularities and abuses complained of and the public wailing that has followed them. Any one habituated to the serious use of his mental talents and gifted with ordinary powers of observation must have been aware of that inevitability. If he could not arrive at logical conclusions from just a casual cooperation or occasional combination of the two qualities, the situation had been adequately pointed out for him by men who were more accustomed to that form of cerebral exercise. The typical business man had been dissected by economists and sociologists, his vital principles had been laid bare, and the inner workings of his mind had been described in understandable terms. As a matter of interest, let us recall a few of the most intelligent and the most intelligible of the many who participated in that service. Let us listen first to Thorstein Veblen, an American economist who interpreted in sociological terms many of the economic habits and theories of our age.

> Industry [production] is carried on for the sake of business, and not conversely; and the progress and activity of industry are conditioned by the outlook of the market, which means the presumptive chance of business profits. . . . Serviceability, industrial advisability, is not the decisive point. The decisive point is business expediency and business pressure. . . . The vital point of production with him [the business man] is the vendibility of the output, its convertibility into money values, not its serviceability for the needs of mankind. . . . This code of business ethics consists, after all, of mitigations of the maxim, *Caveat emptor*. . . . The motive of business is pecuniary gain, the method is essentially purchase and sale. The aim and usual outcome is an accumulation of wealth.

IN like vein speaks the German economist, Werner Sombart:

> The purpose of economic activity under capitalism is acquisition, and more specifically acquisition in terms of money. . . . Acquisition which is quantitatively and qualitatively absolute degenerates eventually into unscrupulousness and ruthlessness. Business draws practical conclusions from the revolutionary supremacy of its ideals and seeks, without consideration for any conflicting interests, to clear all obstacles to the limitless and unqualified exercise of acquisition. The intensity of the acquisitive drive attains a point at which all moral and temperamental inhibitions disappear and all conflicting drives become inhibited. The business man is "unscrupulous" in his choice of ways and means, because the selection is based exclusively on their serviceability in the achievement of the final goal, on their usefulness as instruments of acquisition.

Or, as Dexter M. Keezer states it:

> From the point of view of those engaged in business as profit seekers, generally called "business men," the acquisi-

tion of profit is an end in itself, it for no other reason than that failure to acquire it threatens their elimination from the ranks of the profit seekers. The difference between the conception of business as a device for providing human beings with the means of livelihood and as a way of acquiring profit represents the essential difference between economics and what is commonly described in the United States as the science of business.

TO admit the truth of all such comments is not necessarily to condemn either business men or their motives. One may recognize, enumerate and explain the activities and incentives of business men without either approving or disapproving them; the analysis is based on standards that have no necessary relation to ethics or morals. And in the same neutral attitude one may try to interpret their influence and to predict their effects. Stuart Chase has recently attempted the latter, but with conclusions with which we do not agree. Taking as his thesis the statement that there wil be no more production for profit, he says:

> In the economy of scarcity, the luxury goods of nobles and landowners came forcibly and painfully out of the hide of peasant and craftsman. We still think in those terms. But a forty-fold increase in energy has made such thinking obsolete. The rich often set us a bad example, true, but their bill for luxuries is a postage-stamp. The system whereby they become rich, however—the vendibility principle—has grown onerous beyond bearing. The flow of energy will no longer tolerate its shackles. An economy of abundance has been trying to operate on the folkways, laws, constitutions, property relations laid down in an economy of scarcity. It will not run. A system based on function must shortly replace the present muddle or the whole social structure will cave in.

All which sounds fearfully depressing and hopeless. Although Mr. Chase is too well informed to attempt to place the blame for the "muddle" to which he refers, the man in the street, overanxious for a quick and easy solution, is crying out against the ignorance, stupidity or culpability of the business man to whom he attributes all our present difficulties. If business men are always and inevitably as self-centered as the statements quoted allege—and, as we have said, we can admit that they are without passing any moral judgment on their motives or actions—they are certainly neither to be blamed nor to be credited for whatever evil or good has resulted from the development of business enterprise. As a class they have not been interested in social problems or social aims, whether these ran parallel with or counter to their own plans. The sore spots as well as the bright spots of our present civilization are here not because of the designs (good or bad) of business men, but largely because so many people have been engrossed with the business of profit seeking and have therefore had so little time and taste for social thinking. And we see nothing particularly blameworthy in the fact. In an age when pecuniary standards have obtained dominance over all others it is but natural that the acquisition of money should have attained a like position. The remedy lies not in a condemnation of business in itself, as has become the practice among ordinary observers, but in the provision of means whereby the interest of the worker and the consumer, who constitute the great bulk of the population, can be assured of a consideration that is relatively proper, both quantitatively and qualitatively. Beginnings in this direction are provided by the National Industrial Recovery Act and by the codes set up under it. Their success in accomplishing the ends sought depends more on the spirit and the degree of integrity with which its principles are embraced and carried out than on any academic sufficiency of the provisions themselves.

The last half-year may be called the period of the "rude awakening," for to many thousands of business men it has brought the greatest shock of a lifetime, a mental jolt from which the great majority have probably not yet recovered. To some the future appears as if filled with uncertainties, not to say impossibilities. To others it offers opportunities for service as well as for self-help and they are determined to seize them. Some business men can be trusted to keep one eye watchful of the public interest and to conduct their operations with a greater regard for the welfare of worker and consumer than has characterized their dealings in the past. Too many, it is to be feared, will require outside encouragement in the form of government supervision or government partnership, as the present administration has called it.

THREE very obvious courses of action are open to us in our desire to improve the lot of the common man. There is the more intelligent, more social-minded and less ego-centric conduct of business by men who can be trusted to be mindful of the public interest without outside policing. Unfortunately there are still too few men of this type in business to meet the needs of the situation, and there is great danger that, if this method were relied upon, we should soon see the return of the confusion and difficulties from which we have not yet emerged. At the other extreme is government ownership of the means of production, a prospect which only a few people can view with any feeling short of alarm. Yet it is the method which will inevitably be adopted if compromise measures do not prove effective. In between lies the idea of partnership between business and government, either of the kind exemplified by the N. R. A. with its plan of government supervision of industry or of the type represented by the government-owned or government-controlled corporation.

The first course offers little hope. The second means the end of production for profit. The third, particularly in the adoption of the mixed-corporation idea in which the state holds a large or a controlling stock interest, promises material advantages in those industries where effective control is necessary. The government had already made use of this compromise plan during the war in the United States Grain, the War Finance and the United States Housing Corporations in which it held all the capital stock, and has recently adopted the mixed-corporation plan in acquiring stock control of certain banks. As long as such methods are available we see no reason for predicting the end of production for profit.

Simplification of Machinery Effects Big Savings in Silica-Plant Costs

One Continuous Ball-Mill Replaces the Numerous Original Batch Mills

By E. M. UNDERWOOD

Patterson Fonndry & Machine Co.

DURING the past four years producers and manufacturers of silica sand, slate, talc, and other nonmetallic minerals have been alert in finding and developing new uses for their products; and modern equipment, installed to bring their costs down to a point where their products could be commercially used for these new purposes, has played a large part in the development. An interesting example of what can be and has been done is furnished by the improvements made by the Potters' Mining & Milling Co. of East Liverpool, O. This company, organized in 1885, is one of the oldest grinders of silica in the United States, and in spite of the fact that all raw material used is shipped from Pennsylvania, it has maintained steady production ever since.

Several years ago a new problem confronted the company because its customers were demanding a product improved from about 97 per cent. through 140-mesh to 97 per cent. through 200-mesh, which considerably increased the grinding cost. After considerable study of new methods it was decided that drastic action was necessary and experts were called in, resulting in the complete abandonment of the old plant and the installation of a modern grinding system. Now, after four years of operation it is interesting to note some of the results of the improvement.

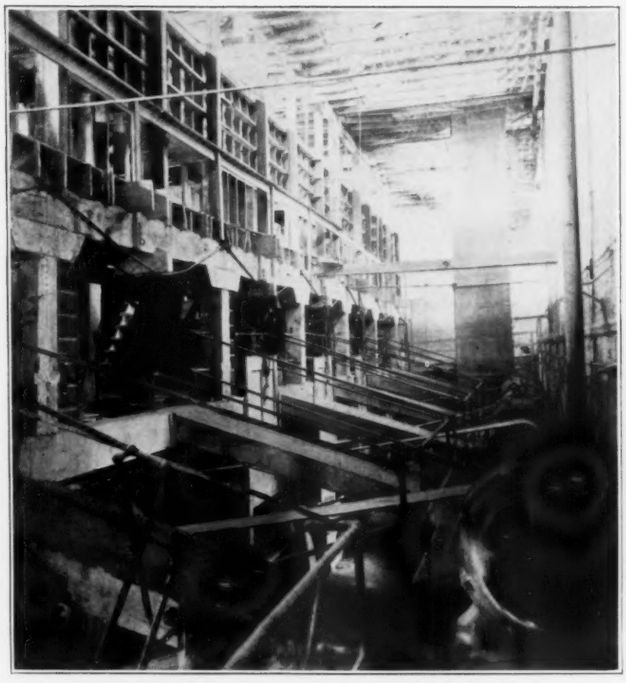
There is now one 8-ft. by 10-ft. continuous-feed-and-discharge ball-mill, silex-lined. Several bins required to serve the numerous old mills have been replaced by one. All the old hand operations, such as the unloading and loading of cars, the feeding of the elevators, the dumping of batch mills and the like, have been eliminated, and the large volume of dust which formerly endangered the health of the workers and caused the loss of large quantities of the finer-mesh materials and therefore more costly finished products, has disappeared.

The mill is fed directly from a 100-ton storage-bin, and the finished product is discharged without intermediate storage directly into waiting freight cars. As it arrives, sand is unloaded directly from the incoming freight cars into an elevator, which carries it to an overhead rubber-covered belt-conveyor, fully-inclosed to prevent the escape of dust. This conveyor dumps into the 100-ton bin where, too, every precaution has been taken to prevent the escape of dust. This bin is of steel and is supported on a structural-steel framework which was completely welded together on the job.

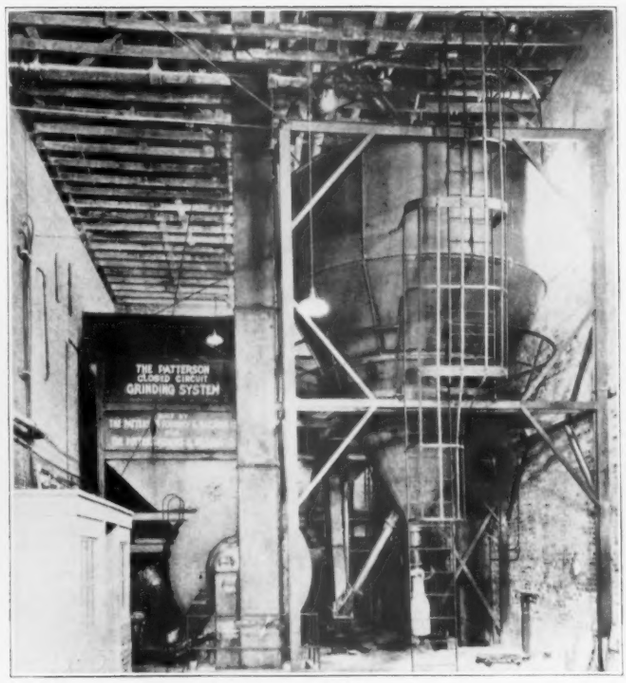
The bin has a sloping bottom fitted with a feeding device of variable capacity, driven by a ¼-hp. motor, which accurately controls the mill feed as desired. The device feeds the material into a pit from which the scoop feed on the mill picks it up and passes it through the hollow shaft or gudgeon into the mill. As fed to the mill, the sand is approximately 93 per cent. through 40-mesh.

As the greatest part of the grinding takes place

The plant of the Potters' Mining & Milling Co. at East Liverpool, O. The left third of the building houses the modern equipment which has displaced machinery that formerly occupied the entire building.



Interior view of the old plant, showing part of the equipment formerly used.



The new equipment which has superseded all the old machinery shown in the other picture.

in the first few feet of the mill, dependence is placed upon the removal of the "fines" as fast as they are created. To this end, the mill is operated in closed circuit with an air-separator. As the "fines" are produced they float to the top and are discharged through the shaft at the end opposite the feed, a special seal being used at this point to prevent the escape of the "fines" as the mill revolves.

Here an interesting device is used to overcome a difficulty that is sometimes experienced with continuous-feed-and-discharge mills. All such mills should be filled to as near the center line as possible with the grinding media but, due to the large size of the openings in the shafts, trouble is sometimes experienced because the pebbles or balls are discharged along with the material, clogging and injuring the elevators and other equipment following the mill. They sometimes even find their way into the finish product. To avoid this difficulty a circular screen has been attached to the gudgeon and revolves with it. Pulverized material sifts through the screen, but occasional pebbles discharged with it are carried over the end of the screen. The finished product enters one passage and is discharged into the elevator, while the stray pebbles enter another passage and are discharged into a bag, so that they may again be fed to the mill along with the silica.

Upon entering the elevator the ground material is elevated to the air-separator, which is of the centrifugal type, 14 ft. in diameter and specially constructed for the handling of this abrasive material. It also is specially fitted to make it air-tight. The separator receives the ground product and automatically separates the "fines" and the oversize material without the use of screens or sifters. The oversize material returns by gravity and a conveyor to the mill for regrinding. In accordance with usual closed-circuit practice no attempt is made to grind all the products to the ultimate fineness during its first passage through the mill. All the "fines" are removed as fast as they are created, while only those which are sufficiently fine to pass the ultimate mesh requirement are discharged as finished product.

Properly-sized material is discharged from the separator into an elevator which carries it high enough for gravity discharge to the waiting cars. No storage-bins are used. The silica is never touched by hand after the incoming cars are unloaded. A building 30 ft. wide, 40 ft. high and 100 ft. long not only houses the entire unit but provides sufficient space for a contemplated second unit.

Standard specifications for the finished product were noted above as 97 per cent. through 200-mesh. This company, however, makes a specialty of a product which is extremely fine, and a great deal of its business calls for material over 99 per cent. of which must pass 200-mesh. In addition, it is possible by slight adjustments, which can be made within an hour's time, to grind a product varying from 100-mesh to 300-mesh, or finer.

Some interesting figures have been collected on the costs at this plant. In the matter of horsepower the elevator and conveyor which unload the cars are driven by a single 10-hp. motor, which by calibration is found to require 4 kw. for normal operation. As a 50-ton car can be unloaded in 6 hr., the power consumption for unloading is 0.48 kw.-hr. per ton of material handled.

The ball-mill is driven by a 100-hp. motor requiring 80 kw. when the output is running from 1.5 to 1.75 tons per hr., so that 53.5 kw.-hr. is required for the mill per ton of material ground. The feeder, elevator, air-separator, finished-product elevator,

(Continued on page 44)

Mineral Aggregate Producers View Future in Spirit of Renewed Optimism

Problems of Code Administration Bring Merger of Association Nearer Reality

THE annual conventions of the National Crushed Stone Assn., the National Sand & Gravel Assn., and the National Slag Assn., were held concurrently Jan. 22 to 26, 1934, at the Netherland Plaza Hotel, Cincinnati, O. Independent meetings of the three associations took up a total of only one day of this time and were devoted almost exclusively to business matters. The usual practice of bringing in outsiders to address these meetings was abandoned for this year because of the press of business and code matters. For the same reason no machinery exhibits were held. Three full days were devoted to joint meetings of the associations for the discussion of the code. On the final day meetings of the boards of directors were held.

Those attending formed probably the most representative group of mineral-aggregate producers ever assembled. Almost every state was represented. Practically all the old members of the associations were present and, in addition, there were many new members and other producers, both stationary-plant and portable-plant, who had never before attended an annual convention. An unofficial count of the registration lists showed a total of 355 producers representing 277 companies and 78 representatives of machinery manufacturers and others.

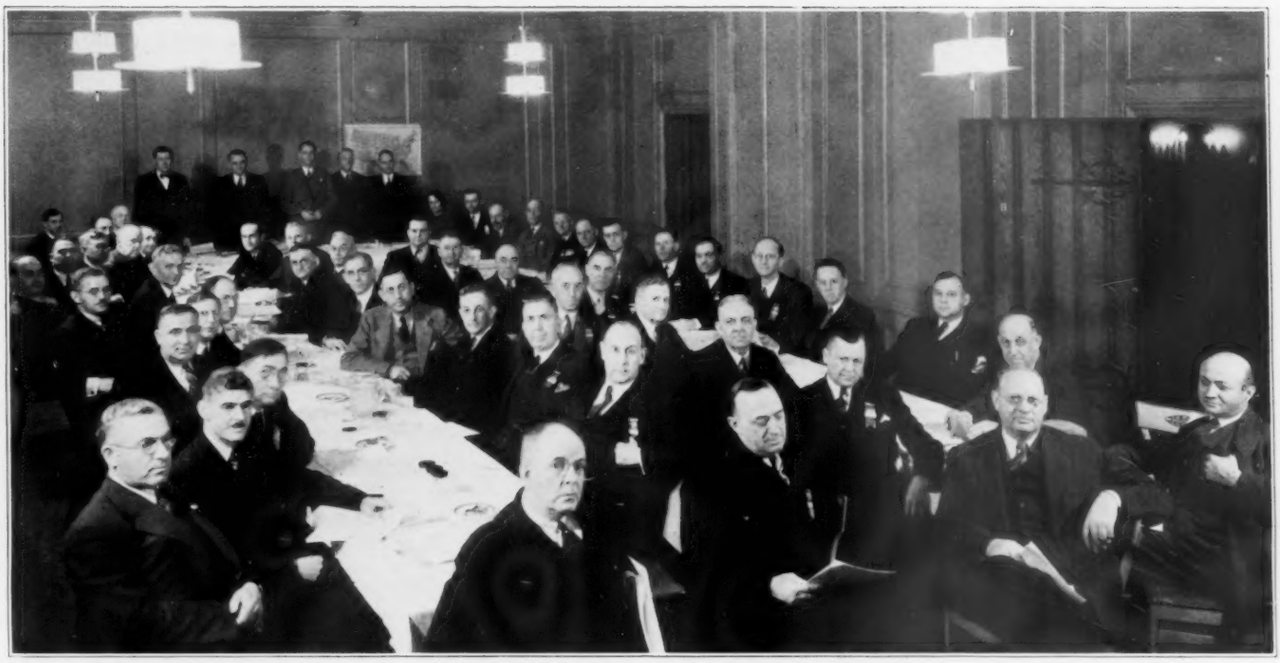
A high spirit of optimism was the keynote of this meeting, the spirit of men who are coöperating wholeheartedly to consolidate the efforts of their industries behind President Roosevelt's recovery program. The consensus of opinion was that the P. W. A. program would bring considerable improvement to the aggregate-production industries and with the other recovery activities in progress would bring an early revival of two of the three large markets for aggregates, private building construction and railroad ballasting. Highway construction, the third large aggregate market, has been the mainstay of the aggregate industries during the depression and with the present indications of at least a partial revival of the other two markets optimism is well justified. The elimination of unfair practices and price-cutting under the code are also expected to help considerably.

Almost the only unfavorable note in the prospects for the year is the rapidly growing production of aggregates, especially for C. W. A. and P. W. A. projects, by plants, both stationary and portable, operated by various governmental bodies. This threat to legitimate producers, however, has resulted in a consolidation of the interests of the portable- and stationary-plant operators and has brought about a spirit of coöperation between them, the lack of which had considerably delayed the formulation and early administration of the code.

Directors' and Code-Authority Meetings

Activities actually began on Sunday, Jan. 21, when the directors of the three associations held separate meetings. The executive sessions of the Code Authority for these industries were held on Monday for purposes of organization. Most of the members elected by the 16 regions were present at

Committee on Organization of Code Authority. Seated (left to right): J. R. Boyd, A. L. Worthen, Alexander Foster, Jr., Otho M. Graves, V. P. Ahearn, C. L. McKenzie, H. V. Owens and H. J. Love. Standing: Robert J. Potts, Ford J. Twaits, R. C. Fletcher, Stirling Tomkins, C. E. Ireland, John Prince, Russell Rarey and W. R. Sanborn.



The Code Authority of the crushed-stone, sand-and-gravel and slag industries.

this open meeting as were many other producers. Members of the press, however, were excluded.

Most of the morning session was spent in electing the additional members at large, as specified in the code. Otho M. Graves was elected chairman of the Code Authority and of the Executive Committee, and the Executive Council of the Code Authority; Russell Rarey, H. V. Owens, and C. L. McKenzie were elected vice-chairmen, H. N. Snyder, treasurer, and V. P. Ahearn executive secretary. The 15 producer members of the executive committee were also appointed. Considerable time was spent in working out rules governing the activities and procedure of the Code Authority in the future.

The first of the joint meetings of the three industries was preceded by a joint luncheon of the three national associations which was held Tuesday and was well attended by the sand-and-gravel, crushed-stone and slag producers and representatives of machinery manufacturers. John Prince, president of the Stewart Sand & Material Co., Kansas City, Mo., presided. After the repast Mr. Prince introduced Harry H. Van Horn, adviser on business practices to the National Recovery Administration and president, Better Business Bureaus of the United States.

Mr. Van Horn, who had made a flying trip from Columbus especially to address this gathering, gave an enlightening discussion of the national recovery program. After tracing the economic and financial background of the N. R. A. he commented on the *rôle* of trade associations under the "new deal."

The Tuesday afternoon joint session of the three industries, the first of the convention, was presided over by H. V. Owens, president of the National Sand & Gravel Assn. The theme scheduled for discussion at this meeting was *The Code of Fair Competition for the Crushed-Stone, Sand-and-Gravel and Slag Industries—Its Development and Principal Features.*

One of the first speakers was Otho M. Graves, newly-elected chairman of the Code Authority for these industries. Mr. Graves made many general recommendations for the operation of the Code Authority and welcomed discussion of this subject. Many questions were asked him regarding the power of the Code Authority to enforce codes and delegate authority. It was brought out during this discussion that any produce can build a new plant anywhere until permissive areas are established and accepted by the Administrator, who is the last authority. It was also brought out that state highway departments are strongly opposing any restriction of the production of aggregates. John Prince then

Otho M. Graves, Chairman of the Code Authority.

stated that, in his opinion, the code provisions give the industry as much power as it can reasonably expect and advised careful consideration of any decisions arrived at on code matters. In answer to questions from many of those present it was stated that, according to present information, signed compliance with the code is necessary for any company which wishes to furnish material for P. W. A. or C. W. A. work and producers were urged to report any violations of this requirement to the Code Au-

CODE AUTHORITY OF CRUSHED-STONE, SAND-AND-GRAVEL AND SLAG INDUSTRIES, 1934

Regions	Industries			Members of Code Authority	Official Title	Member Executive Committee	Member Executive Council	Company or Association Connection
	CrSt	SG	Slag					
				(1) Members Chosen by Industries and Regions. [Code: Sec 4 (a) (1)]				
1	×	×	(1)	A. L. WORTHEN PAUL P. BIRD		×		Connecticut Quarries Co., Inc., New Haven, Conn. Boston Sand & Gravel Co., Boston, Mass.
2	×	×	×	OTHO M. GRAVES ANDERSON DANA HARRIS N. SNYDER	Chairman Treasurer	× ×	× ×	General Crushed Stone Co., Easton, Pa. Seaboard Sand & Gravel Corp., New York, N. Y. Buffalo Slag Co., Inc., Buffalo, N. Y.
3	×	×	×	A. W. WORTHINGTON ALEXANDER FOSTER, JR. JOHN M. BUCKLAND		×	×	Pittsburgh Limestone Co., Pittsburgh, Pa. Warner Co., Philadelphia, Pa. National Slag Co., Allentown, Pa.
4	×	×	×	L. J. BOXLEY W. A. SMOOT J. J. HOCK		×		W. W. Boxley & Co., Roanoke, Va. Smoot Sand & Gravel Co., Washington, D. C. Maryland Slag Co., Baltimore, Md.
5	×	×	×	T. I. WESTON H. G. BOYD C. E. IRELAND		×		Weston & Brooker Co., Columbia, S. C. Southern Sand & Gravel Co., Selma, Ala. Birmingham Slag Co., Birmingham, Ala.
6	×	×	(1)	H. E. RODES H. P. CALDWELL		×		Franklin Limestone Co., Nashville, Tenn. Ohio River Sand Co., Louisville, Ky.
7	×	×	(1)	R. S. WILSON ROBERT J. POTTS		×		Big Rock Stone & Material Co., Little Rock, Ark. Potts-Moore Gravel Co., Waco, Tex.
8	×	×	×	H. M. SHARP F. D. COPPOCK W. E. BLISS		×		France Stone Co., Toledo, O. American Aggregates Corp., Greenville, O. Standard Slag Co., Youngstown, O.
9	×	×	×	E. J. KRAUSE E. GUY SUTTON L. E. MCDERMUT		× ×		Columbia Quarry Co., St. Louis, Mo. Neal Gravel Co., Mattoon, Ill. Illinois Slag & Ballast Co., Chicago, Ill.
10	×	×	×	A. J. BLAIR H. N. BATTJES K. A. DIETRICH				Lake Shore Sand & Stone Co., Milwaukee, Wis. Grand Rapids Gravel Co., Grand Rapids, Mich. Great Lakes Steel Corp., Detroit, Mich.
11	×	×	(1)	C. A. WAGNER S. J. READER				C. A. Wagner Construction Co., Sioux Falls, S. D. S. J. Reader Co., Minneapolis, Minn.
12	×	×	(1)	R. C. FLETCHER FRED P. CURTIS				Flint Crushed Gravel Co., Des Moines, Ia. Lyman-Richey Sand & Gravel Co., Omaha, Neb.
13	×	×	(1)	JOHN PRINCE H. E. WEST		×		Stewart Sand & Material Co., Kansas City, Mo. West Sand Co., Muskogee, Okla.
14	×	×	×	M. W. WOODWARD F. P. SPRATLEN, JR. ARTHUR L. ALLEN				Woodward Construction Co., Rock Springs, Wyo. J. W. Brannan Sand & Gravel Co., Denver, Colo. Arthur & Allen, Pueblo, Colo.
15	×	×	(1)	ANSON S. BLAKE FORD J. TWAITS				Blake Bros. Co., San Francisco, Cal. Consolidated Rock Products Co., Los Angeles, Cal.
16	×	×	(1)	PORTER W. YETT GEORGE W. GAUNTLETT				City Motor Trucking Co., Portland, Ore. Pioneer Sand & Gravel Co., Seattle, Wash.
				(2) Members Chosen at Large [Code: Sec. 4 (a) (2)]				
1, 2, 3	×	× ×	× ×	WILSON P. FOSS H. S. DAVISON H. V. OWENS EARL FLAD C. L. MCKENZIE	 Vice-chairman Vice-chairman	 × ×	 × ×	New York Trap Rock Corp., New York, N.Y. J. K. Davison & Bros., Pittsburgh, Pa. Eastern Rock Products, Inc., Utica, N.Y. Carnegie Steel Co., Pittsburgh, Pa. Duquesne Slag Products Co., Pittsburgh, Pa.
4, 5, 6, 7	× ×	× ×	×	THOMAS MCCROSKEY W. F. WISE J. RUTLEDGE HILL W. H. KLEIN GEORGE A. MATTISON, JR.				American Limestone Co., Knoxville, Tenn. Southwest Stone Co., Dallas, Tex. Gifford-Hill & Co., Inc., Dallas, Tex. Dixie Sand & Gravel Co., Chattanooga, Tenn. Woodstock Slag Corp , Birmingham, Ala.
8, 9, 10	× ×		×	RUSSELL RAREY W. R. SANBORN FRED HUBBARD	Vice-chairman	×	×	Marble Cliff Quarries Co., Columbus, O. Lehigh Stone Co., Kankakee, Ill. Standard Slag Co., Youngstown, O.
11, 12, 13, 14, 15, 16		× ×		ERIC W. RYBERG J. L. SHIELY				Stauffer Sand & Gravel Co., Salt Lake City, Utah. J. L. Shiely Co., St. Paul, Minn.
				(3) Trade-Association Representatives [Code: Sec. 4 (a) (3)]				
	×	×	×	J. R. BOYD V. P. Ahearn H. J. LOVE	Asst. Treas. Executive Secy. Recording Secy.	×	×	National Crushed Stone Assn., Washington, D. C. National Sand & Gravel Assn., Washington, D. C. National Slag Assn., Cleveland, O.
				(5) [2] Government Representative [Code: Sec. 4 (a) (5)]				
				R. E. PLIMPTON		×	×	National Recovery Administration, Washington, D. C.
Totals	22	23	13			17	8	

[1] No slag production. [2] No representatives yet selected to fulfill provisions of Sec. 4 (a) (4)

thority. Many other questions were asked to which no definite answers could yet be given. Ford J. Twaits made a number of suggestions on how to obtain local support for the code through coöperation with contractors, public-works officials, chambers of commerce, etc.

A second joint session of the three industries was held Wednesday morning with A. L. Worthen, president of the National Crushed Stone Assn., in the chair. Scheduled for discussion at this meeting were the *Open-price Policy; Uniform Cost Accounting; Uniform Terms of Sale; Uniform Credit Practices*—all of paramount importance to the producers. The discussion of these subjects was entered into by many of the large attendance.

Mr. Foster opened the discussion by reviewing the progress of the open-price provision in the code. He also stated that the open-price policy could be made to stabilize prices at a profitable level. He also pointed out the success of the open-price policy in certain sections. For successful application of this policy, he said, rules in various districts must conform to local conditions. He also recommended the establishment of trucking zones so that a truck differential could be added to price quotations.

F. J. Twaits, Los Angeles, Cal., briefly outlined a system of contract forms and uniform costs which has been used successfully for years in that district. A 20-cents-per-ton cash discount for payment within 10 days resulted in collections never lower than 85 per cent. by the 10th of the month even during the depression, he said.

In response to many questions it was brought out that the prime cost plus 10 per cent. minimum established by the administration, which conflicts to some extent with the open-price policy, was established to protect producers in certain sections who use little equipment and whose prime cost is a greater percentage of the total than is the case in the average plant.

The continued joint meeting of the three industries on Wednesday afternoon was to have been presided over by C. L. McKenzie, president of the National Slag Assn. As he was unable to attend this meeting John Prince, Kansas City, Mo., took charge. The subject scheduled for this session was *The Function of District Committees, Regional Committees, Division Committees and the Code Authority in the administration of the Code.* Among the things brought out were the facts that it is not necessary to incorporate a regional committee and that proxies are not allowed at regional-committee meetings. It also developed that assessments for financing the code can only be made through the Code Authority.

Mr. Prince recommended that legal advice be sought in wording any rules so that they would stand if it ever became necessary to enforce them through the courts. H. V. Owens then pointed out that the two important functions of a district committee are to specify exactly the area included in a district and to act as a clearing-house for routine matters.

Wednesday evening six separate group meetings were held for round-table discussions of various code provisions. The subjects of these meetings and the producers leading these discussions follow:

1. Open-Price Policies and Cost Determination.—Alexander Foster, Jr.

2. Production Control.—H. E. Rodes; assisted by Stanton Walker and A. T. Goldbeck.

NATIONAL CRUSHED STONE ASSOCIATION
1934

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Washington, D. C.

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Norristown, Pa.

A. T. GOLDBECK, *Director Bureau of Engineering*
Washington, D. C.

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W. F. WISE, Dallas, Tex.
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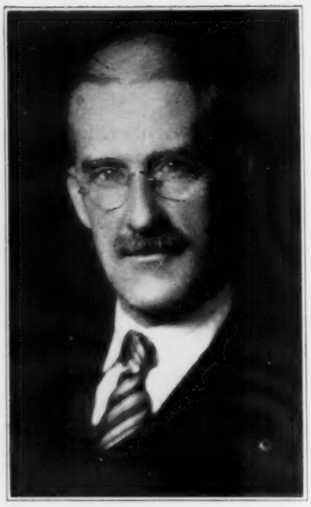
PORTER W. YETT, Portland, Ore.

A. L. Worthen, retiring crushed-stone association president.

Russell Rarey, newly-elected president of the National Crushed Stone Assn.



William E. Hilliard, leader of the cost-accounting discussion.

3. Hours of Labor and Rates of Wage.—E. Guy Sutton.

4. Hours of Labor and Rates of Wage on Floating Equipment.—Paul P. Bird.

5. Uniform Cost Accounting—William E. Hilliard.

6. Administration of the Code.—John Prince.

a. Through districts. b. Through regions. c. Through divisions. d. Through the Code Authority.

At the production-control meeting it was brought out that small permissive areas are desirable for established producers, having either stationary or portable plants, and that existing boundary lines should be used wherever possible. Mention was made of one state committee which has applied for the entire state as a permissive area, another which has applied for each county as a permissive area, and another which has applied separately for each township in the state.

Most of the members of the Code Authority attended the discussion devoted to administration of the code. The most important fact brought out at this meeting was that the state and regional code-administrative bodies were mainly responsible for the application of the code to their districts. It was also stated that there is as yet no means of regulating the opening of new plants by any government subdivision.

The final joint session opened with Russell Rarey, Marble Cliff Quarries Co., Columbus, O., presiding. The subject listed for this meeting was *State Committees and Their Relation to Production Control.* Mr. Rarey opened the meeting with an admonition to proceed carefully in establishing permissive areas as production control is involved in a code for probably the first time and is on trial with N. R. A. officials. He urged that sound facts accompany applications for permissive areas.

H. H. Brandon, C. C. Beam, Inc., Melvin, O., and chairman of the Ohio State Committee under the aggregate code, then described the work that had been done in Ohio before application for a permissive area. A survey made in securing facts showed that there are 109 producing plants in Ohio, of which 20 are owned by railroads and 64 were not reported for taxation. Only 16 of these plants were shown to have a capacity of over 500 tons daily. R. N. Coolidge, Cumberland River Sand Co., Nashville, Tenn., and T. W. Havely, Central Rock Co., Lexington, Ky. chairmen of the code committees of those states, also described the progress made and methods used in those states.

On Thursday evening a joint banquet of the three aggregate associations was held and was well attended. Robert J. Potts, president of the Potts-Moore Gravel Co., Waco, Tex., and a past president of the National Sand & Gravel Assn., was toastmaster. Music and light entertainment were provided during and after the dinner. Mr. Potts then introduced the principal speaker of the evening, Willard T. Chevalier, industrial advisor for the N.R.A. in the formulation, approval and organization of the mineral-aggregates code.

Mr. Chevalier praised as an important step in industrial self-government the creation of the new "aggregates industry" through unselfish leadership of representatives of the sand-and-gravel, crushed-stone and slag industries.

Scott Turner, director, U. S. Bureau of Mines, made the annual safety awards for the crushed-stone and sand-and-gravel industries. In the crushed-stone industry the award went to the plant of the North American Cement Corp., Martinsburg, W. Va. Eighteen other concerns of the 42 entered also had no accidents during the year. In the sand-and-gravel industry plants of the Warner Co., at Morrisville, Pa., and the Stewart Sand & Material Co., Kansas City, Mo., were tied for first place. Of the 37 concerns entered in this contest 19 others also reported no accidents.

Crushed-Stone Meetings

The first independent session of the National Crushed Stone Assn. on Tuesday morning was

opened by A. L. Worthen, president, who briefly reviewed the developments of the past year, especially pertaining to code matters. After stressing the importance of continuing the engineering work of the association he announced that most of the time at this convention would be devoted to discussions of the code, this also being given as the reason for not holding a machinery exhibit this year. He commented on the improvement in competitive conditions due to the code and the bright prospects for the future.

Mr. Worthen then went on to state that in his opinion a merger of the three aggregates associations was imminent and advisable. The first step toward such a merger, he said, was taken at the 1933 conventions at Detroit, where for the first time the crushed-stone and sand-and-gravel associations held concurrent sessions and a joint exhibit. This trend was further accelerated by the formation of a mineral-aggregates code combining these three industries. Such a merger, he said, would greatly facilitate the code work now in progress, but should not involve a merger of the separate engineering departments as each industry has its own distinct problems. Such a merger, in his opinion, was inevitable, regardless of the future of the N. R. A., and would greatly simplify the administration of the code.

Mr. Worthen further explained the temporary discontinuance of publication of the *Crushed-Stone Journal* which will again be resumed when finances allow. A greatly increased membership was announced, 63 companies having joined during the year while only 11 resigned, an increase of 52 for the year, making the total membership now 175 companies.

A. T. Goldbeck, director of engineering and research, then read condensed reports of the directors from the various regions on the business conditions during 1933 and the outlook for 1934. Summarized, these reports indicated that the total business during 1933 was probably somewhat less than in 1932 and that competitive conditions and prices were at a low point early in the year. More encouraging, however, was the general statement that sharp improvement in production, prices and competitive conditions was noticeable late in the year. This trend was sufficient to enable many producers to show a profit for the year, although operating at a capacity as low as 35 per cent. Prospects for 1934 were generally conceded to be very bright from every angle, due mainly to the public-works program. In the opinion of several the stabilization of the dollar, which has since taken place, would also have a highly beneficial effect in the release of private funds for construction work.

Mr. Worthen then introduced from the floor two of the pioneer members of the association who had not been active in its affairs in recent years but who considered this meeting to be too important to be missed. They were John Wunder, president, Trap Rock Co., Minneapolis, Minn., and Anson S. Blake, president, Blake Bros. Co., San Francisco, Cal.

J. R. Boyd, secretary, and A. T. Goldbeck then made their annual reports. Mr. Goldbeck stated that the engineering department devoted much of its time during the year to code and aggregates-statistics and problems but did not neglect the problems of the producers. Considerable progress was made in the standardization of sizes and work is being done in coöperation with other associations and organizations on this important subject. He reported also that the circular-track tests, which the engineering department has been working on for several years, met with the approval of numerous state highway engineers who visited the association's laboratories during the year. Tests made by this method, asserted Mr. Goldbeck, proved that the regular wear tests are not good indicators of the value of aggregates in concrete, bituminous mixes, etc. Contacts with highway engineers are proving valuable in promoting coöperation on standards and specifications.

John Prince, member of Code Authority.

H. V. Owens, reëlected president of the National Sand & Gravel Assn.

Robert J. Potts, member of Code Authority.

NATIONAL SAND AND GRAVEL ASSOCIATION
1934

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G. W. RENWICK, *Vice-President*
Chicago, Ill.

H. S. DAVISON, *Secretary-Treasurer*
Pittsburgh, Pa.

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Memphis, Tenn.

M. A. NEVILLE,
Lafayette, Ind.

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ROBERT J. POTTS,
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JOHN PRINCE,
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Logtown, Miss.

CHAS. H. YOUNG,
Minneapolis, Minn.

Tests were also made on the expansion and contraction of concrete caused by changes in temperature and moisture. Concrete was submerged in water, the temperature of which was alternately raised and lowered from 70 to 135 deg. F. from 40 to 50 times. Measurements made at each temperature extreme showed an increasing residual expansion at the lower extreme and an increasingly greater total expansion at the higher temperature extreme. According to Mr. Goldbeck, some of the concrete specimens cracked slightly during the progress of these tests. The conditions under which these tests were made, he said, are similar to those to which concrete pavements are subjected.

First in the order of business at the Thursday afternoon independent session were the reports of the three committees appointed on the first day of the convention. The chairmen of the auditing and resolutions committees first read their reports which were unanimously approved. W. E. Hilliard, chairman of the nominating committee then read the nominations for officers and directors of the association for 1934. The nominees were unanimously voted into office. Russell Rarey, Marble Cliff Quarries Co., Columbus, O., is the new president and chairman of the Board of Directors, and A. B. Mack, Cleveland, O., replaced Mr. Rarey as vice-president for the Central Region.

Sand-and-Gravel Meetings

The first independent meeting of the eighteenth annual convention of the National Sand & Gravel Assn. was held Tuesday morning, Jan. 23. H. V. Owens, Syracuse, N. Y., president, presided and opened the proceedings with a brief discussion of the developments of the past year. Executive secretary V. P. Ahearn also made a brief annual report.

John Prince, Kansas City, Mo., then gave an impromptu talk on the code work done thus far. In the course of this work it was found that 50,000,000 tons of material was produced by portable plants in 1932, one-third of the total tonnage produced in the country. As the code work went along, said Mr. Prince, the stationary-plant operators became more tolerant of the portable-plant operators, who have become well organized and show an excellent spirit of coöperation and willingness to work with and under the code. He also commented on the co-operation between the three aggregate associations.

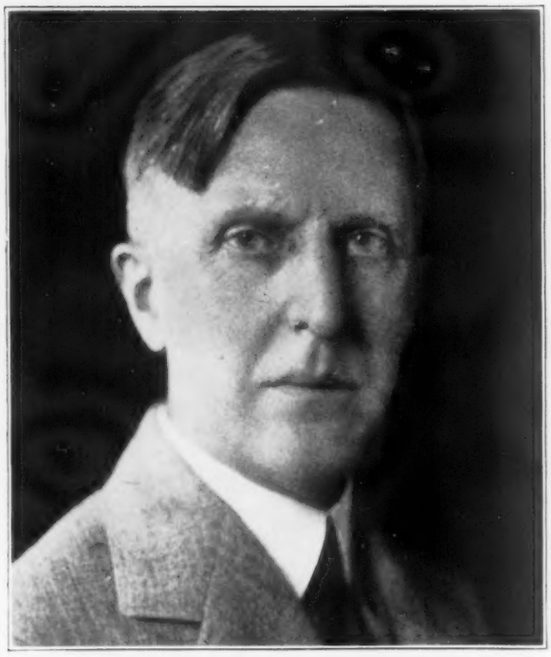
Robert J. Potts, Waco, Tex., then outlined the effects he believed the code would have on the sand-and-gravel industry. These were a restored confidence, the evolution of a form of self-government in keeping with the real intent of President Roosevelt, and the replacement of individual self-interest with a more coöperative ideal. Mr. Potts stated that, in his opinion, the code will eliminate the cut-throat competitive methods which have intensified the effects of the depression and the industry as a whole will be in better shape to do its share in the improvement of general business.

The annual report of the treasurer, H. S. Davison, Pittsburgh, Pa., was read by Stanton Walker, director of engineering and research and was accepted. Mr. Walker in making his report of the activities of his department emphasized the work done on the durability of aggregates, and on moisture content, etc., much of this having been done in coöperation with other associations, especially the A. S. T. M. Other important work was the study of aggregates for bituminous pavements for secondary roads. He also stated that the cement-bound macadam type of road in improved form was showing a revival of the popularity it had early in

E. Guy Sutton, member of Code Authority.

the century, due largely to the demand for a low-cost hard-surfaced road.

President Owens stated that the sand-and-gravel industry would coöperate to the greatest possible extent with the other mineral-aggregate industries on the code and other matters but advised that sand-and-gravel producers remember the individual problems of the industry. Independent research work must be continued in order that sand and gravel may be sold against the competition of the products of the other industries. Mr. Owens then introduced S. J. Reader, Minneapolis, Minn., and J. F. Bloomer, Appleton, Wis., portable-plant operators, and told of the splendid coöperation of the National Assn. of Portable Stone, Sand & Gravel Producers with the sand-and-gravel association.



C. L. McKenzie, reëlected president of the National Slag Assn.

V. P. Ahearn, executive secretary of the association, then emphasized the extent to which plants, both portable and stationary, operated by cities, counties, states, and other government bodies, have encroached upon the production of the industry. According to U. S. Bureau of Mines figures, in 1928 these plants produced only 5 per cent. of the total tonnage of sand and gravel but in 1932 this figure had risen to 28 per cent. Governments produced 10,000,000 tons of sand and gravel in 1928 and 32,000,000 tons in 1932.

Mr. Ahearn said that efforts are being made to combat this condition and that the Code Authority has sent out letters calling attention to it. He said that convict labor must be eliminated and that information is continually pouring into the association's offices on the growth of government-operated plants. He asked that producers call the attention of the association to any producers who are not conforming to the code, especially those supplying aggregates for P. W. A. and C. W. A. projects. According to Mr. Ahearn, signed compliance with the code is required in order to supply materials for such work.

At the final independent meeting the reports of the resolutions committee were heard and the nominating committee entered the names of officers and directors for the coming year. The only change in the officers was in the vice-presidency, George W. Renwick of the Chicago Gravel Co. being elected in place of J. C. Buckbee, whose business was such that he could not devote sufficient time to the association. After the election of officers H. F. Thomson, president of the National Ready-Mixed Concrete Assn., was introduced and gave a short talk.

Slag Meetings

The first independent meeting of the National Slag Assn., on Tuesday morning was presided over by C. L. McKenzie, president of the association, and was mainly given over to the presentation and discussion of two excellent papers. The smallness in numbers at this meeting was more than compensated for by the coöperative spirit shown.

The first one was by Dr. H. F. Kriege, member of the Technical Problems Committee of the association. The discussion, profusely illustrated by charts and photographs which were projected on a screen, told of the research by Dr. Kriege on bituminous mixtures and mineral aggregates. He explained the advantages of a testing machine with a circular track over other methods, and explained the construction of this machine. He then went on to tell of the failures of different types of materials under various conditions. The discussion of this paper was very animated and was participated in by all those present. Discussion was closed finally because of time limitations.

Fred Hubbard, director of research of the association, gave an interesting *résumé* of the status of the association's 10-yr. test program. This paper, also illustrated by charts and photographs, told of the tests being conducted on concrete, using an aggregate slag, crushed stone, and gravel in various quantities. The pieces are being tested over a period of time to determine relative strengths. Part are kept in dry storage and part in moist storage. It

NATIONAL SLAG ASSOCIATION
1934

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C. L. McKenzie, *President*
Pittsburgh, Pa.

C. E. Ireland, *Vice-president*
Birmingham, Ala.

H. J. Love, *Secretary-Treasurer*
Cleveland, O.

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Buffalo, N. Y.

is interesting to note that the dry-storage test pieces showed a declining strength after a short period, regardless of the aggregate used. As the paper merely reported the progress of the series of tests and as the tests are by no means completed, it would be unjust to publish in detail the results so far secured.

At a special meeting that evening a discussion was held on *The National Slag Assn. Within N. R. A.*, which was led by C. E. Ireland, vice-president of the association. The responsibilities of the members on the various regional committees were emphasized.

At the final independent meeting, held in the association room on Thursday afternoon, the reports of the financial, technical, membership and convention committees were heard and the election of officers was held. In the report of the secretary, H. J. Love, the necessity of the continuation of the research program of the association was emphasized. He also told how the slag association was welcomed into the code organization and of how effectively the members were coöperating. The report of the committee on finance was read, as well as the report of the membership committee, which was able to report an increase in membership.

The following officers were reëlected for the coming year: president, C. L. McKenzie, president, Duquesne Slag Products Co.; vice-president, C. E. Ireland, president, Birmingham Slag Co.; secretary and treasurer, H. J. Love. Mr. McKenzie was again drafted for the position as president over his protests. It was felt that he had done such admirable work in guiding the association to its present standing that it would be a poor policy to change presidents at this time.

Manufacturers' Joint Meeting

The joint dinner meeting of the Manufacturers' Divisions of the National Crushed Stone Assn. and the National Sand & Gravel Assn. was held Tuesday evening. The meeting was called to order by Abe Goldberg, Allis-Chalmers Mfg. Co., Milwaukee, Wis., chairman of the crushed-stone division, who, after a few introductory remarks, turned the chair over to D. D. Guilfoil, Sauerman Bros., Inc., Chicago, Ill., chairman of the sand-and-gravel division. An informal discussion regarding exhibits for the 1935 convention followed. The general sentiment was favorable but no definite decision was reached. A. L. Worthen, president, National Crushed Stone Assn., and H. V. Owens, president, National Sand & Gravel Assn., cordially extended the greetings of their associations. Otho M. Graves, chairman, Code Authority, briefly discussed the relationship of this body with the Manufacturers' Division and voiced his opinion that the three aggregate associations would eventually merge into one association with three divisions each headed by a vice-president. The dinner was then served.

The following officers of the sand-and-gravel division were nominated and elected by unanimous vote: C. S. Huntington, Link-Belt Co., Chicago, Ill., chairman. Vice-chairmen: J. F. Berger, John A. Roebling's Sons Co., Trenton, N. J.; Bradley S. Carr, American Manganese Steel Co., Chicago Heights, Ill.; H. T. Gracely, Marion Steam Shovel Co., Marion, O.; Delbert Kay, Nordberg Mfg. Co., Milwaukee, Wis.; Bruce G. Shotton Hendrick Mfg. Co., Trenton, N. J.; L. W. Shugg, General Electric Co., Schenectady, N. Y.; W. L. Wettlaufer, Niagara Concrete Mixer Co., Buffalo, N. Y.

The following officers were nominated and unanimously elected by the Manufacturers' Division of the National Crushed Stone Assn.: F. O. Wyse, Bucyrus-Erie Co., South Milwaukee, Wis., chairman. Vice-chairmen: Gordon Buchanan, Pennsylvania Crusher Co., Philadelphia, Pa.; Lucius Beebe, Troco Lubricating Co., Philadelphia, Pa.; M. S. Lambert, Robins Conveying Belt Co., New York, N. Y.; S. R. Russell, E. I. Dupont de Nemours & Co., Wilmington, Dela.; C. S. Huntington, Link-Belt Co., Chicago, Ill.

The Board of Directors includes, in addition to those just named, R. C. Johnson, Simplicity Engineering Co., Durand, Mich.; E. C. Bauer, Kensington Steel Co., Cleveland, O.; J. Barab, Hercules Powder Co. Wilmington, Dela.; G. M. Dyke, Stearns Conveyor Co., Cleveland, O.; H. T. Gracely, Marion Steam Shovel Co., Marion, O.; Delbert Kay, Nordberg Mfg. Co., Milwaukee, Wis.; W. H. Milroy, Earle C. Bacon Co., New York, N. Y.; Carl Swanson, Illinois Powder Mfg. Co., St. Louis, Mo.; F. B. Ungar, Ludlow-Saylor Wire Co., St. Louis, Mo.; W. L. Wettlaufer, Niagara Concrete Mixer Co., Buffalo, N. Y., M. S. Kincaid, Burton Explosive Co., Cleveland, O.; B. G. Shotton, Hendrick Mfg. Co., Carbondale, Pa.; L. W. Shugg, General Electric Co., Schenectady, N. Y.; S. W. Traylor, Jr., Traylor Eng. & Mfg. Co. Allentown, Pa.; Albert E. Reed, W. S. Tyler Co., Cleveland, O.

The representatives on the Board of Directors of National Crushed Stone Assn. are Abe Goldberg, L. W. Shugg and F. O. Wyse.

REGISTRATION

Producers

Allen, Arthur L.; Arthur & Allen, Pueblo, Colo.
Allen, H. B.; General Crushed Stone Co., Philadelphia, Pa.
Anderson, Paul R.; Arrow Sand & Gravel Co., Columbus, O.
Andrew, A. M.; Hopkinsville Stone Co., Hopkinsville, Ky.
Andrews, Wm. M.; Union Limestone Co., New Castle, Pa.
Armitage, Zain; Lebanon, O.
Atkins, G. F.; National Lime & Stone Co., Findlay, O.
Atwood, E. R.; Old Colony Crushed Stone Co., Quincy, Mass.
Ault, C. M.; Barnes Sand & Gravel Co., Piketon, O.
Baker, Guy C.; American Aggregate Corp., Greenville, O.
Baker, J. E.; Laura Gravel & Stone Co., Phillipsburg, O.
Baker, Roger; Laura Gravel & Stone Co., Phillipsburg, O.
Bales, M. M.; Elmhurst Chicago Stone Co., Elmhurst, Ill.
Balfe, George H.; Monon Crushed Stone Co., Monon, Ind.
Barber, W.; Barber Sand & Gravel Co., Cincinnati, O.
Barres, A. G.; General Crushed Stone Co., Wilkesbarre, Pa.

Bassett, George O.; Bassett Hardware Mfg. Co., Monticello, Ky.
Battjes, H. N.; Grand Rapids Gravel Co., Grand Rapids, Mich.
Beam, C. C.; C. C. Beam, Inc., Melvin, O.
Beatty, R. D.; Dolcito Quarry Co., Birmingham, Ala.
Bedford, J. W.; Bedford - Nugent Co., Evansville, Ind.
Berman, Lynn; National Crushed Stone Co., New Haven, Conn.
Biehn, F. O.; C. C. Beam, Inc., Melvin, O.
Billman, H. E.; Rock Hill Quarries Co., St. Louis, Mo.
Birchall, H. R.; Ohio Gravel Co., Cincinnati, O.
Bird, Paul P.; Boston Sand & Gravel Co., Boston, Mass.
Blair, A. J.; Lake Shore Sand & Stone Co., Milwaukee, Wis.
Blake, Anson S.; Blake Bros. Co., San Francisco, Calif.
Bliss, W. A.; Keystone Sand & Supply Co., Pittsburgh, Pa.
Bliss, W. E.; Standard Slag Co., Youngstown, O.
Bloomer, John F.; Appleton, Wis.
Boxley, Abney; Blue Ridge Stone Corp., Roanoke, Va.
Boxley, L. J.; Blue Ridge Stone Corp., Roanoke, Va.
Boyd, H. G.; Southern Sand & Gravel Co., Selma, Ala.
Bovlston, E. D.; Goodwin-Gallagher Sand & Gravel Co., New York, N. Y.
Boynton, E. W. III, Northern Gravel Co., Muscatine, Ia.
Boynton, E. W., Jr.; Northern Gravel Co., Muscatine, Ia.
Brandon, Harry H.; C. C. Beam, Inc., Melvin, O.
Brewer, W. O.; Brewer & Brewer Sons, Inc., Chillicothe, O.
Brooks, H. C.; Central Rock & Sand Co., Kingsport, Tenn.
Brown, Albert M.; Brown Huffstetter Material Co., Indianapolis, Ind.
Brown, Herbert E.; Brown - Rosenbarger Gravel Co., Indianapolis, Ind.
Brown, W. Jess; Dixie Sand & Gravel Corp., Chattanooga, Tenn.
Brownson, Harold R.; Rowe Contracting Co., Malden, Mass.
Buchholtz, C. L.; Genesee Stone Products Corp., Batavia, N. Y.
Buckland, John M.; National Slag Co., Allentown, Pa.
Burke, Jos. F.; Eastern Sand & Gravel Co., Philadelphia, Pa.
Butterworth, A. C.; Alpha Sand Co., St. Louis, Mo.

Caldwell, A. B.; Genesee Stone Products Corp., Batavia, N. Y.
Caldwell, H. P.; Ohio River Sand Co., Louisville, Ky.
Caldwell, W. L.; Southern Aggregates Corp., Birmingham, Ala.
Callanan, J. R.; Callanan Road Improvement Co., S. Bethlehem, N. Y.
Campbell, Bruce S.; Harry T. Campbell Sons Co., Towson, Md.
Campbell, R. S.; Holston Quarry Co., Knoxville, Tenn.
Carpenter, H. A.; St. Mary's, W. Va.
Carter, W. N.; National Stone Co., Joliet, Ill.
Cartwright, Ben H.; John W. Karch Stone Co., Celina, O.
Cartwright, L. R.; Mid-West Rock Products Corp., Indianapolis, Ind.
Cayia, A. J.; Inland Lime & Stone Co., Manistique, Mich.
Christman, J. B.; South Bend Sand & Gravel Corp., South Bend, Ind.
Clark, Claude L.; Regional Code Committee, Columbus, O.
Clark, Harvey N.; Dolomite Products Co., Rochester, N. Y.
Cobb, Collier, Jr.; Cobb & Homewood, Chapel Hill, N. C.
Collings, B. H., Colonial Supply Co., Louisville, Ky.
Connelly, N. D.; Chicago, Ill.
Conrades, Otto S.; St. Louis Material & Supply Co., St. Louis, Mo.
Coolidge, R. N.; Cumberland River Sand Co., Nashville, Tenn.
Coppock, F. D.; American Aggregates Corp., Greenville, O.
Cooley, C. G.; Cooley Gravel Co., Chillicothe, Mo.
Cornuelle, Fred W.; Ohio Gravel Co., Cincinnati, O.
Couchman, A. R.; North American Cement Corp., Baltimore, Md.
Cross, Edwin; Gould & Cross, Grand Rapids, Mich.
Curnutt, W. W.; American Limestone Co., Knoxville, Tenn.
Curtis, Fred P.; Lyman-Richey Sand & Gravel Co., Omaha, Neb.
Curtis, H. F.; Curtis-Hill Gravel & Sand Co., Philadelphia, Pa.
Cushing, J. E.; Cushing Stone Co., Schenectady, N. Y.
Custis, W. V.; C. C. Beam, Inc., Melvin, O.

Dafler, C. O.; C. O. Dafler Gravel & Sand Co., West Carrollton, O.
Dana, Anderson; Seaboard Sand & Gravel Corp., New York, N. Y.
Davidson, J. K.; Davidson Granite Co., Lithonia, Ga.
Davidson, Jas. R.; Miami Gravel Co., Huntington, W. Va.
Davison, H. S.; J. K. Davison & Bro., Pittsburgh, Pa.
Dean, H. J.; Ripley County Construction Co., Batesville, Ind.
Dietrich, K. A.; Great Lakes Steel Corp., Detroit, Mich.
Dillard, John; Sturm & Dillard Co., Columbus, O.
Dillman, K. W.; Dillman Industries, Inc., Caruthersville, Mo.
Dodson, H. O.; Indianapolis Sand & Gravel Co., Indianapolis, Ind.
Dokoff, Kelly; Ashland Lime Stone Co., Carter, Ky.
Dolese, Henry; Dolese Bros. Co., Chicago, Ill.
Doran, George W.; Cincinnati Quarries Co., Cincinnati, O.
Dow, R. H.; Basic Dolomite, Inc., Cleveland, O.
Driscoll, George F.; District 3, Region 8, Wilmington, O.
Duff, W. W.; New Castle Lime & Stone Co., New Castle, Pa.
Duffy, J. H.; Ohio River Sand Co., Louisville, Ky.
Dugan, J. N.; Cincinnati, O.
Dyament, L. J.; Ward Sand & Gravel Co., Oxford, Mich.

Edgeworth, M.; Lehigh Stone Co., Kankakee, Ill.
Ernst, Frank X.; Buffalo Gravel Corp., Buffalo, N. Y.

Feather, H. W.; Carbon Limestone Co., Youngstown, O.
Fehr, W. H.; Berks Products Corp., Reading, Pa.
Flad, E. L.; Carnegie Steel Co., Pittsburgh, Pa.
Fletcher, R. C.; Flint Crushed Gravel Co., Des Moines, Ia.
Foland, D. S.; Keystone Gravel Co., Dayton, O.
Foss, Wilson P., Jr.; New York Trap Rock Corp., New York, N. Y.
Foster, Alexander, Jr.; Warner Co., Philadelphia, Pa.
France, E. H.; Erie Stone Co., Toledo, O.
Fuller, F. C.; Portsmouth Sand & Gravel Co., Portsmouth, O.

Gettys, R. E., Jr.; Knoxville Sangravl Material Co., Knoxville, Tenn.
Gilbert, H. C.; France Stone Co., Toledo, O.
Goodpastor, E. J.; Northern California Dist.; Region 15, San Francisco, Calif.
Gorman, J. J.; Zanesville Gravel Co., Dresden, O.
Graebner, C. E.; Northern Gravel Co., Muscatine, Ia.
Graham, Paul C.; Graham Bros., Inc., Los Angeles, Calif.
Graves, H. B.; Ontario Sand & Gravel Co., Inc., Geneva, N. Y.
Graves, Otho M.; General Crushed Stone Co., Easton, Pa.
Gray, C.; American Aggregates Corp., Indianapolis, Ind.
Gray, Gaylord E.; Central Sand & Gravel Co., Des Moines, Ia.
Gray, L. B.; Eastern Rock Products, Inc., Utica, N. Y.
Gucker, F. T.; John T. Dyer Quarry Co., Norristown, Pa.
Guthrie, George; Oak Hill Gravel Co., Springfield, O.

Haas, Harold H.; Haas Gravel Co., Clayton, O.
Haggerty, F.; General Concrete Products Corp., Warren, Pa.
Hailey, W. L.; Estill Springs Sand & Gravel Co., Nashville, Tenn.
Hall, A. Acton; Ohio Marble Co., Piqua, O.
Hall, Mrs. A. Acton; Ohio Marble Co., Piqua, O.
Hall, F. E.; Ohio Gravel Co., Cincinnati, O.
Hammerschmidt, Geo. F.; Elmhurst-Chicago Stone Co., Elmhurst, Ill.
Hammerschmidt, Martin; Elmhurst - Chicago Stone Co., Elmhurst, Ill.
Hammond, Ernest M.; Gravel Products Corp., Buffalo, N. Y.
Handley, W. A.; Greenfield Quarries Co., Greenfield, O.
Hardendorf, J. R.; Meshberger Bros. Stone Co., Linn Grove, Ind.
Harris, C. O.; Flint Sand & Gravel Co., Jahncke Service, Inc., New Orleans, La.
Hart, Don R.; Hart Gravel Co., Worthington, Ind.
Hartley, C. J.; Elmhurst-Chicago Stone Co., Elmhurst, Ill.
Hartong, George H.; Morton Sand & Gravel Co., Chicago, Ill.
Hartsook, Chas. C.; Lime Bluff Co., Muncy, Pa.
Havely, T. W.; Central Rock Co., Lexington, Ky.
Hedrick, B. V.; B. V. Hedrick Gravel & Sand Co., Lilesville, N. C.
Hegler, L. W.; J. C. O'Connor & Sons, Ft. Wayne, Ind.
Heim, P. E.; Carbon Limestone Co., Youngstown, O.
Heimlich, J. L.; Le Roy Lime & Crushed Stone Corp., Le Roy, N. Y.
Heinritz, F. J.; Ohio Marble Co., Piqua, O.
Henderson, R. C.; Suiter Material & Transport, Manchester, O.
Hendy, Michael; St. Louis, Mo.
Henley, R. B.; Michigan Limestone & Chemical Co., Rogers City, Mich.
Hill, J. Rutledge; Gifford-Hill Co., Inc., Dallas, Tex.
Hilliard, Wm. E.; New Haven Trap Rock Co., New Haven, Conn.
Hillman, H. W.; Tygart Limestone Co., Lawton, Ky.
Hogue, Frank; Stonestreet & Hogue, Garrett, Ind.
Holloway, H. H.; Holloway Gravel Co., Inc., Amite, La.
Hooker, A. J.; Buffalo Crushed Stone Co., Buffalo, N. Y.
Howard, Walter E.; Howard Concrete Products Co., Cincinnati, O.
Hubbard, Fred; Standard Slag Co., Youngstown, O.
Hunter, C. M.; Pounding Mills Quarry Corp., Pounding Mills, Va.

Immel, R. P.; American Limestone Co., Knoxville, Tenn.
Ireland, C. B.; Montgomery Gravel Co., Montgomery, Ala.
Ireland, C. E.; Birmingham Slag Co., Birmingham, Ala.
Isaacs, W. Bruce; Central Rock Co., Lexington, Ky.

Jackson, Joseph H.; Carbon Limestone Co., Youngstown, O.
Jacobs, M. L.; Bethlehem Steel Co., Bethlehem, Pa.
Johnson, R. W., C. C. Beam, Inc., Melvin, O.
Johnston, V. O.; Lincoln Sand & Gravel Co., Lincoln, Ill.

Kaufman, E. J.; Marble Cliff Quarries Co., Columbus, O.
Kelb, N. E.; Erie Stone Co., Indianapolis, Ind.
Kelly, R. M.; Eastern Rock Products, Inc., Utica, N. Y.
Kern, Fred T.; Tiffany Sand & Gravel Co., Milwaukee, Wis.
Kerr, M. F.; American Aggregates Corp., Detroit, Mich.
Kerr, R. L., Jr.; William M. Bird & Co., Inc., Columbia, S. C.
Kilcawley, W. H.; Standard Slag Co., Youngstown, O.
Killins, G. E.; Killins Gravel Co., Ann Arbor, Mich.
Kirkman, A. B.; Consolidated Quarries Corp., Atlanta, Ga.
Kimble, Clarence A.; Kimble Sand & Gravel Co., Hamilton, O.
Klein, W. H.; Dixie Sand & Gravel Corp., Chattanooga, Tenn.
Knight, H. I. G.; Rubber City Sand & Gravel Co., Akron, O.
Knoblauch, C.; National Lime & Stone Co., Findlay, O.
Koehring, R. H.; Richmond Gravel Co., Richmond, Ind.
Krause, E. J.; Columbia Quarry Co., St. Louis, Mo.
Kriege, H. F., Dr.; France Stone Co., Toledo, O.
Kuehne, Otto, Jr.; Kansas Sand Co., Topeka, Kan.

Lacy, H. M.; Gifford-Hill & Co., Inc., Dallas, Tex.
Lanagan, T. A.; General Crushed Stone Co., Winchester, Mass.
Lane, A. S.; John S. Lane & Son, Inc., Meriden, Conn.
Laun, A. A.; Elkhart-Moraine Sand & Gravel Co., Elkhart Lake, Wis.
Lavers, W. W.; Great Lakes Steel Corp., Detroit, Mich.
Lewis, W. J.; L. W. Lewis Sons, Emporia, Kan.
Liggett, J. H.; Van Camp Sand & Gravel Co., Cincinnati, O.
Lindsay, W. H.; Canada Crushed Stone Corp., Ltd., Hamilton, Ont.
Long, Frank J.; West Roxbury Trap Rock Co., West Roxbury, Mass.
Long, R. E.; Cooley Gravel Co., Gosport, Ind.
Lott, G. D.; Palmetto Quarries Co., Columbia, S. C.
Luker, C. L.; McGrath Sand & Gravel Co., Lincoln, Ill.

McClary, Sam W.; Hugo Sand & Gravel Co., Kent, O.
McCourt, F. M.; John McCourt Co., Boston, Mass.
McCourt, L. T.; Central Sand & Gravel Co., Memphis, Tenn.
McCroskey, Thos.; American Limestone Co., Knoxville, Tenn.
McCullough G. C.; Birmingham Slag Co., Birmingham, Ala.
McCullough, J. W.; Denton Sand & Gravel Co., St. Louis, Mo.
McDermut, L. E.; Illinois Slag & Ballast Co., Chicago, Ill.
McGrew, William; L. & M. Stone Co., Utica, N. Y.
McGrath, T. E.; McGrath Sand & Gravel Co., Lincoln, Ill.
McGuffin, J. W.; Suiter Material & Transp. Co., Manchester, O.
McGurk, H. L.; Interstate Sand & Gravel Co., Terre Haute, Ind.
McKee, Mark T.; Sand Products Corp., Detroit, Mich.
McKenzie, C. L.; Duquesne Slag Products Co., Pittsburgh, Pa.
McKinney, Bernard A.; West Roxbury Trap Rock Co., West Roxbury, Mass.
McLaughlin, F. F.; General Crushed Stone Co., Syracuse, N. Y.
McLean, Ralph E.; East St. Louis Stone Co., East St. Louis, Mo.
McLester, J. C.; Ashland Sand & Gravel Co., Ashland, Ky.
Mann, Lance; Russellville, O.
Marsman, C.; Marsman & Taber, Grand Rapids, Mich.
Mattis, Ed.; Laura Gravel & Stone Co., Phillipsburg, O.
Mattison, Geo. A., Jr.; Woodstock Slag Corp., Birmingham, Ala.
Maxwell, C. W.; Albany Gravel Co., Inc., Albany, N. Y.
May, Edwin P.; Union Sand & Gravel Co., Huntington, W. Va.
Mayer, J.; Bethlehem Steel Co., Bethlehem, Pa.
Meisinger, R. W.; Hyrock Products Co., Evansville, Ind.
Mifford, John A.; Estill Springs Sand & Gravel Co., Nashville, Tenn.
Miller, Marshall; Bedford Stone Products Co., Bedford, Ind.
Mills, E. E.; American Aggregates Corp., Greenville, O.
Mobley, J. H.; Olive Hill Limestone Co., Olive Hill, Ky.
Moore, S. P.; Builders Material Co., Cedar Rapids, Ia.
Morgan, Verne C.; Ky. Consolidated Stone Co., Louisville, Ky.
Moynehan, Mrs. J. D.; A. Frederick Sand & Gravel Co., Johnstown, N. Y.
Mullen, C. F.; Georgia Gravel Co., Columbus, Ga.
Munz, C. A.; Eastern Rock Products, Inc., Utica, N. Y.

Neal, B. E.; Neal Gravel Co., Mattoon, Ill.
Nettleton, Elwood T.; Connecticut Quarries Co., Inc., New Haven, Conn.
Neville, M. A.; Western Indiana Gravel Co., LaFayette, Ind.
Noelp, J. E.; Newark Sand & Gravel Co., Newark, O.
Noone, Ava M.; George H. Noone Sand & Gravel Co., Boston, Mass.

Oberle, Chas. K.; North Cincinnati Sand & Gravel Co., Cincinnati, O.
Ohlemacher, F. W.; Kelley Island Lime & Transport Co., Cleveland, O.
O'Keefe, D. H.; Springfield-Pekin Sand & Gravel Co., Springfield, Ill.
O'Neil, Dick; Southern Ohio Quarries Co., Chillicothe, O.
O'Toole, Edward; Glacier Sand & Stone Co., Islington, Mass.
Owens, F. C.; General Crushed Stone Co., Syracuse, N. Y.
Owens, H. V.; Eastern Rock Products, Inc., Utica, N. Y.

Pardum, Chas. H.; Sturm & Dillard Co., Syracuse, Ind.
Parks, Howard; East Texas Gravel Co., Dallas, Tex.
Paynter, W. B.; Kentucky-Virginia Stone Co., Middlesboro, Ky.
Peck, F. W.; Peck-Woolf Sand & Material Co., Kansas City, Mo.
Pelsue, H. F. C.; Graham Bros., Inc., Los Angeles, Calif.
Peterson, Henry W.; Strathmann Sand & Gravel Co., Paulsboro, N. J.
Piper, Clyde; Connersville Gravel Co., Inc., Connersville, Ind.
Pickitt, Harry; Pickitt & Goodwin, Allegan, Mich.
Popplewell, T. E.; Fort Worth Sand & Gravel Co., Fort Worth, Tex.
Potts, R. J.; Potts-Moore Gravel Co., Waco, Tex.
Powers, C. A.; Herkimer Quarries, Inc., Newport, N. Y.
Price, W. T.; W. T. Price, Inc., Miami, Fla.
Prince, John; Stewart Sand & Material Co., Kansas City, Mo.

Qualkinbush, William; Qualkinbush Bros., Paoli, Ind.

Rack, George L.; George L. Rack, Inc., Cincinnati, O.
Ragland, W. T.; Raleigh Granite Co., Raleigh, N. C.
Rainer, H. E.; Federal Crushed Stone Corp., Buffalo, N. Y.
Rarey, Russell, Marble Cliff Quarries, Columbus, O.
Rawn, A. B.; Wilson Sand & Supply Co., Huntington, W. Va.
Ray, Earl; Ray & Son Sand & Gravel Co., Louisiana, Mo.
Reader, S. J.; S. J. Reader Co., Minneapolis, Minn.
Redman, John E.; Mildman Imp. Corp., Rochester, N. Y.
Rehnquist, V. N.; Mt. Carmel Sand & Gravel Co., Mt. Carmel, Ill.
Reimann, H. W.; William Nading Grain Co. (Gravel Div.), Shelbyville, Ind.
Reinhold, P. B.; Reinhold Co., Inc., Pittsburgh, Pa.
Renwick, G. W.; Chicago Gravel Co., Chicago, Ill.
Rice, John; General Crushed Stone Co., Easton, Pa.
Rice, Jr., John; General Crushed Stone Co., Easton, Pa.
Richardson, George H.; Standard Slag Co., Youngstown, O.
Richmond, J. L.; Union Sand & Gravel Co., Huntington, W. Va.
Rigg, J. A.; Acme Limestone Co., Alderson, W. Va.
Robinson, Henry O.; Greenfield Massachusetts Broken Stone Co., Greenfield, Mass.
Robinson, Edward; Massachusetts Broken Stone Co., Stony Brook, Mass.
Rodes, H. E.; Franklin Limestone Co., Nashville, Tenn.
Rodgers, Phil. K.; McCrady-Rodgers Co., Pittsburgh, Pa.
Rosenbarger, Chas.; Brown - Rosenbarger Gravel Co., Indianapolis, Ind.
Ruckstuhl, Edwin W.; Willey-Ruckstuhl Co., Cincinnati, O.
Russell, H. J.; Jointa Lime Co., Glen Falls, N. Y.
Ruth, C. Z.; Kanawha Sand Co., Parkersburg, W. Va.
Ryberg, Eric; Utah Sand & Gravel Products Corp., Salt Lake City, Utah.

Sanborn, W. R.; Lehigh Stone Co., Kankakee, Ill.
Sanders, C. C.; Western Hills Sand & Gravel Co., Cleves, O.
Sanders, W. H.; Western Indiana Gravel Co., Lafayette, Ind.
Sanford, Jesse; Speedway Gravel Co., Indianapolis, Ind.
Sankey, John; Chicago Gravel Co., Chicago Heights, Ill.
Savage, James; Buffalo Crushed Stone Co., Buffalo, N. Y.
Schmidt, F. W.; North Jersey Quarry Co., Morristown, N. J.
Schwartz, Otto; American Brick Co., Inc., New Orleans, La.
Seitz, A. G.; General Crushed Stone Co., Syracuse, N. Y.
Settle, J. M.; Ohio River Sand Co., Louisville, Ky.
Shallcross, S. M.; American Lime & Stone Co., Bellefonte, Pa.
Sharkey, M. Jane; District 3, Region 8, Wilmington, O.
Sharp, H. M.; France Stone Co., Toledo, O.
Shaw, G. E.; Millville Gravel Co., Hamilton, O.
Shearer, Jesse A.; Indiana Gravel Co., Indianapolis, Ind.
Shepherd, R. C.; Carbon Limestone Co., Youngstown, O.
Shiely, J. L.; J. L. Shiely Co., Inc., St. Paul, Minn.
Slater, C. H.; Standard Lime & Stone Co., Baltimore, Md.
Slater, H. C.; Chillicothe Sand & Gravel Co., Chillicothe, O.
Slocum, H. S.; Radford Limestone Co., Inc., East Radford, Va.
Smith, Charles A.; Oil City Sand & Gravel Co., Oil City, Pa.
Smith, H. L.; Kirkpatrick Gravel Co., Cambridge City, Ind.
Snouffer, L. L.; J. & L. Snouffer, Dublin, O.
Snyder, Harris N.; Buffalo Slag Co.; Federal Crushed Stone Corp., Buffalo, N. Y.
Sounders, Earl G.; John T. Dyer Quarry Co., Norristown, Pa.
Sparks, W. C.; Cedar Bluff Quarry, Princeton, Ky.
Spencer, R. G.; National Lime & Stone Co., Findlay, O.
Spice, A. N.; Duquesne Slag Products Co., Pittsburgh, Pa.
Sporborg, W. L.; General Crushed Stone Co., Syracuse, N. Y.
Spratlen, Jr., F. P.; J. W. Brannan Sand & Gravel Co., Denver, Colo.
Squire, R. L.; Jackson & Squire, Sandburn, Ind.
Stepanian, Stephen; Aroow Sand & Gravel Co., Columbus, O.
Stewart, H. H.; J. K. Davison & Bro., Pittsburgh, Pa.
Stillion, H. D.; Muskingum River Gravel Co., Zanesville, O.
Stolle, F. W.; Casper Stolle Quarry & Contracting Co., E. St. Louis, Ill.
Stone, W. M.; Western Sand & Gravel Co., Lincoln, Neb.
Stonestreet, Wm.; Stonestreet & Hogue, Garrett, Ind.
Stull, J. W.; Liberty Limestone Corp., Rocky Point, Va.
Sullivan, John B.; Eastern Sand & Gravel Corp., Philadelphia, Pa.
Suiter, T. L.; Suiter Material & Transp. Co., Manchester, O.
Sutherland, George E.; West Virginia Sand & Gravel Co., Charleston, W. Va.
Sutton, E. Guy; Neal Gravel Co., Mattoon, Ill.
Symes, W. H.; Marion Sand & Gravel Co., Marion, O.

Taylor, N. Powell; Cerulean Stone Co., Henderson, Ky.
Tejan, Frank; Dayton, O.
Thomas, C. E.; Ideal Sand & Gravel Co., Mason City, Ia.
Thompson, James R.; Blanton Stone Co., Frankfort, Ky.
Thomson, H. E.; General Material Co., St. Louis, Mo.
Tomkins, Stirling; N. Y. Trap Rock Corp., New York City.
Trittschub, E. M.; Ohio Gravel Co., Cincinnati, O.
Twaits, Ford J.; Consolidated Rock Products Co., Los Angeles, Calif.

Van Camp, R. E.; Van Camp Sand & Gravel Co., Cincinnati, O.
Vincent, Lyle D.; Ohio River Sand & Gravel Co., Parkersburg, W. Va.

Wade, Edgar L.; Arundel Corp., Baltimore, Md.
Wagner, C. A.; Concrete Materials Co., Sioux Falls, S. D.
Wagoner, J. H.; Eastern Rock Products, Inc., Utica, N. Y.
Wallace, Jr., W. H.; Wallace Stone Co., Bay Port, Mich.
Walsh, P. J.; West Virginia State Committee.
Wanstrath, Theodore; New Point Stone Co., Inc., Batesville, Ind.
Warner, Charles; Warner Co., Philadelphia, Pa.
Watson, W. P.; Hamilton Gravel Co., Hamilton, O.
Weaver, R. E.; Lincoln Sand & Gravel Co., Lincoln, Ill.
Welch, F. M.; American Aggregates Corp., Greenville, O.
Weldon, Jr., W. H.; Fanwood Stone Crushing & Quarry Co., Westfield, N. J.
West, H. E.; West Sand Co., Muskogee, Okla.
Weston, T. I.; Weston & Brooker Co., Columbia, S. C.
White, R. C.; Cook Stone Co., Hopkinsville, Ky.
White, Robert E.; Concrete Products Co. of Absecon, N. J., Absecon, N. J.
Williams, E. D.; H. E. Millard, Annville, Pa.
Willson, L. E.; Tennessee Valley Sand & Gravel Co., Sheffield, Ala.
Wilson, R. S.; Big Rock Stone & Material Co., Little Rock, Ark.
Wise, W. F.; Southwest Stone Co., Dallas, Tex.
Woodward, M. W.; Woodward Construction Co., Rock Springs, Wyo.
Wooley, S. M.; S. M. Wooley Quarry, Marion, O.
Wormer, W. J.; Consumers Co., Chicago, Ill.
Worthen, A. L.; Connecticut Quarries Co., New Haven, Conn.
Worthington, Arthur W.; Pittsburgh Limestone Co., Pittsburgh, Pa.
Wortman, I. W.; North Jersey Quarry Co., Morristown, N. J.
Wunder, John; Trap Rock Co., Minneapolis, Minn.

Yager, P. A.; River Sand & Gravel Co., Owensboro, Ky.
Yett, Porter W.; City Motor Trucking Co., Portland, Ore.
Young, C. H.; Chas. H. Young Co., Minneapolis, Minn.
Young, W. J.; Standard Lime & Stone Co., Martinsburg, W. Va.

Zimmerman, Earl; Ohio Gravel Co., Cincinnati, O.

Old lithograph showing the Kingston quarry as it was more than sixty years ago, when it was known as Howell's Quarries. Washington's former headquarters in left background.

New Jersey's Newest Crushed-Stone Plant Uses Tower System of Storage

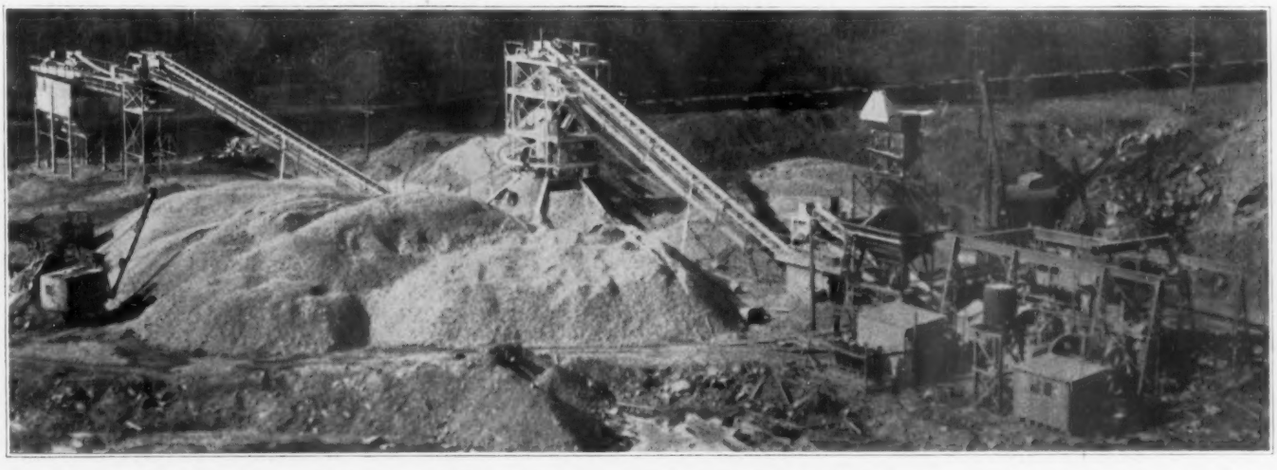
Dust Collected at Crusher Discharge Used in Aggregate-Bituminizing Plant

By W. E. TRAUFFER

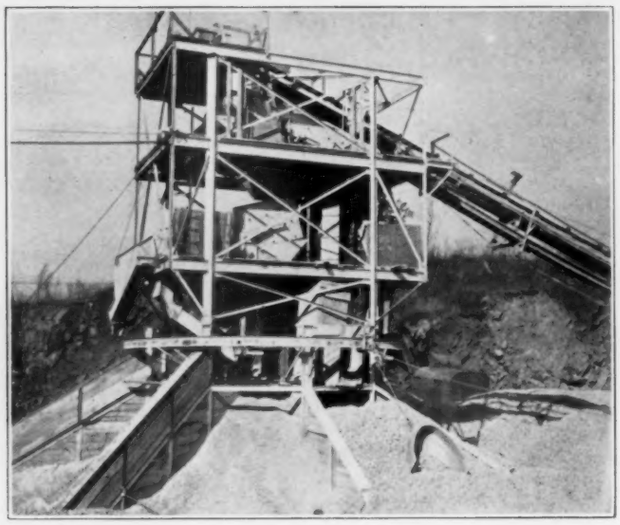
LOCATED in a section with a rich historic background, only 3 mi. north of Princeton, N. J., is one of the largest and probably the most interesting of the new crushed-stone plants put into operation during 1933, that of the Kingston Trap Rock Co., near Kingston. A house once used by George Washington as his headquarters is on the property and is one of the historic landmarks of that section. Prominent features of the plant are its simple yet flexible straight-line design, the use of the Kern tower-system of storage, and the collection of dust at the crushers as it is created.

The 250-acre property on which the plant is located is almost entirely workable and consists of extremely hard trap rock similar to that found at Rock Hill, Pa., and North Bergen, N. J. This deposit has an interesting history as the quarry was first opened in 1860 for paving blocks and dimension stone. Later small crushing operations were located there. The quarry was not used from 1915 to 1930. In 1930 a plant of 50 tons per hr. capacity was built on this property by Theodore Potts and was operated by him until March, 1933, when the present owners took possession. Construction of the new plant was begun immediately and was completed Aug. 1, 1933, the old plant having been operated in the meantime and then dismantled.

The new plant is of all-steel-and-concrete construction and has a conveying and screening capacity of 300 tons per hr. and an even greater crushing capacity. Its capacity can be increased merely by speeding up the conveyors and installing additional screening capacity. L. R. Gilbert, owner of the company, designed the general plant lay-out and superintended its construction. Earle C. Bacon, Inc., designed the crusher lay-out, and the Robins Conveying Belt Co. designed the conveying and screening equipment to fit the crushing, washing,



General view of the operations of the Kingston Trap Rock Co. Crushers, with dust-collecting unit, at right; screening and storage tower, center; loading and washing building, left.



The screening building mounted on the storage-tower. Conveyor from scalping screen at right and drag-scraper in foreground.

The washing tower at right with conveyor to truck-loading storage-bins. Traveling tripper can also discharge direct to cars.

and loading facilities and the storage tower.

The plant operated steadily from the time it went into operation until late in January, 1934. At that time weather conditions made it impossible to continue operation and it is planned to resume operations about March 1. About 40 men were employed, working on two 6-hr. shifts. Most of the stone produced is used for highway construction.

The overburden on the deposit averages about 4 ft. in depth and is removed by power shovel and motor truck. The face averages 75 ft. in height and the present system is to make single-row shots, using 7-in. holes spaced 22 ft. apart. Drilling is done by an Armstrong well-drill with wire rope and a Keystone drill with regular rope. These units are operated by Buda gasoline engines. Atlas 40-, 60- and 75-per cent. explosives are used, the 75-per cent. at the bottom of the hole. Detonation is done electrically. What little secondary drilling is required is done with Ingersoll-Rand Jackhamers but most of the large stone is broken by mud-capping.

Shortly after the plant went into operation it was decided to try the tunnel method of blasting also on another section of the quarry face. The tunnel is being driven with drifter drills and will be 45 ft. deep with 40-ft. branches at right angles at its inner end. It is expected that 75,000 tons or more of stone will be brought down with this one shot, which will be made either late in February or early in March. An Ingersoll-Rand gasoline-engine-driven portable compressor furnishes the air for the Jackhamer and drifter drills.

The stone is loaded by a Marion 2-cu.yd. electric shovel and a Marion 1½-cu.yd. electric shovel into Mack 6-ton trucks of which there are four. These haul the material a distance of 200 ft. to the plant, where they back up a short inclined dirt fill to discharge it into the Farrel-Bacon 42-in. by 60-in. primary jaw crusher. This is ordinarily set to reduce the stone to 7-in. size and under and discharges to a 36-in. inclined belt-conveyor which feeds the 5-ft. by 12-ft. Robins Gyrex single-deck vibrating scalping screen. This screen has 2⅞-in. wire cloth at the upper and 2¾ and 2⅝-in. at the lower end of this deck.

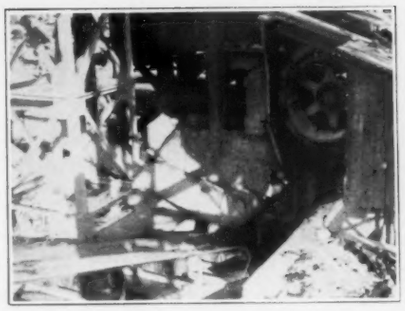
The oversize is discharged to a 30-in. inclined return belt-conveyor which feeds through a split chute to either or both of two Farrel-Bacon secondary jaw crushers. One is a 36-in. by 24-in. unit and the other a 24-in. by 13-in. machine. Both crushers reduce the stone to 3-in. size or less and discharge it to the main conveyor feeding the scalping screen.

All three crushers are arranged side by side over this main belt-conveyor. A Chisholm-Moore chain hoist, on a structural-frame overhead track spanning the crushers, can be used to service them or to handle a stone hook to dislodge stone in the primary crusher. The dust-collecting system previously men-

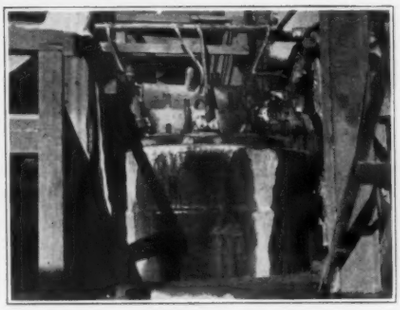
A section of quarry face showing results of recent blast. Two well-drills above.

Two quarry workmen placing charges for mud-capping some of the larger stones.

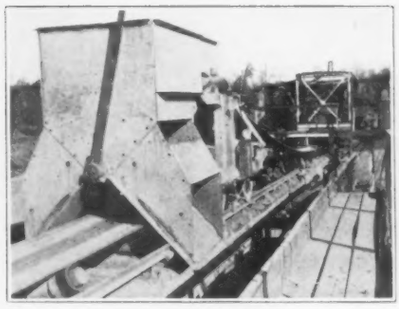
The 2-cu.yd. electric crawler shovel shown opening a new section of the quarry.



One of the reduction crushers and the main conveyor with connections to the dust-collecting system.



Close view of one of the three jaw crushers used in this plant. Note pressure lines for lubrication.



The traveling tripper over the truck-loading bins with vibrating washing screen in background.

tioned is connected to the discharge spouts of these crushers. This system is described in detail later.

The crusher arrangement at this plant allows a high degree of flexibility without loss of crushing capacity or efficiency. The 60-in. by 42-in. primary crusher has been set with a 4-in. opening at which point it has more than the required capacity. With this setting and the above-mentioned openings on the scalping screen, the two secondary crushers easily reduce the over-size product to 2½-in. size and under. According to Mr. Gilbert, the 36-in. by 24-in. crusher was at one time shut down and the primary crusher closed tight enough to reduce the stone to approximately 60 per cent. 2½-in. size. The 24-in. by 13-in. crusher did all the secondary work under this arrangement, which gave a capacity of 70 tons per hr. This would have been even greater had quarrying conditions not been difficult at that time. The plant has also been operated satisfactorily using only the 36-in. by 24-in. crusher for rejections.

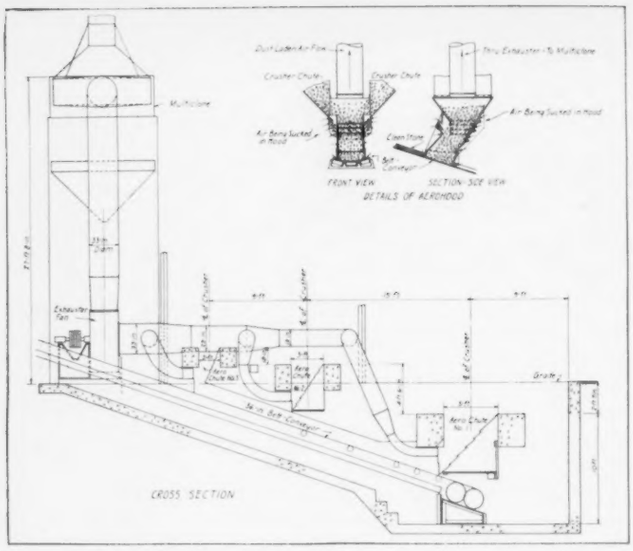
Sometimes there is a demand for more than the normal production of ⅜-in. stone. The special jaw plates, with which the secondary crushers are fitted, allows them to be closed down so that a capacity of 40 tons per hr. of this size can be obtained. The quantities of the different sizes produced can be varied merely by opening or closing the secondary crusher jaws.

The material passing through the scalping screen is discharged to a 24-in. inclined belt-conveyor which carries it to the screening building on the top of the storage tower. A Robins Gyrex 5-ft. by 12-ft. triple-deck vibrating screen does the first sizing, the sizes of cloth used varying according to the products desired. The three sizes of material retained on the decks of this screen are chuted direct to storage. The material passing through the bottom deck is fed by gravity to a second 5-ft. by 12-ft. Robins Gyrex triple-deck screen which does the final sizing. Wire cloth with ⅛-in. openings is used on the bottom deck of this screen but the sizes on the other two decks vary according to the demand. The three sizes of material and the dust produced by this screen are chuted direct to storage. The seven sizes of stone produced are: minus 3-, 2½-, 1½-, ¾-, ⅝-, ⅜-in. and screenings.

The Kern tower system used is divided into 8 radial storage compartments for the 7 sizes of material produced. Because of the demand for the 1½-in. stone two compartments are used for this material. The system has a live capacity of 1,800 tons of material which can be discharged by gravity to the loading system, and a total capacity of 200,000 tons when built up to a depth of 40 ft. and to a radius of 200 ft. A Sauerman 1½-cu.yd. Crescent drag-scraper is used to handle the material to and from dead storage. The tail pulley of this scraper system is hooked to a steel ring encircling the tower at the top of the storage partitions in the same manner as in other Kern-system installations. An electric hoist mounted on a gasoline truck, which travels on an elevated roadway that is about 15 ft. high and has a 250-ft. radius, operates the scraper and serves as a movable tower. Originally a 1-cu.yd. scraper was installed but, because of the large loading capacity of the plant, this was recently replaced with the present 1½-cu. yd. unit. The small crescent scraper was operated temporarily with a Byers gasoline

Looking down from main conveyor at three jaw crushers. Return conveyor from scalping screen at left.

The dust-collecting system which is connected to the discharge spouts of the jaw crushers.



Cross-sectional elevation and detail drawings of the dust-collecting system at the crushers.

crawler crane as the movable head tower.

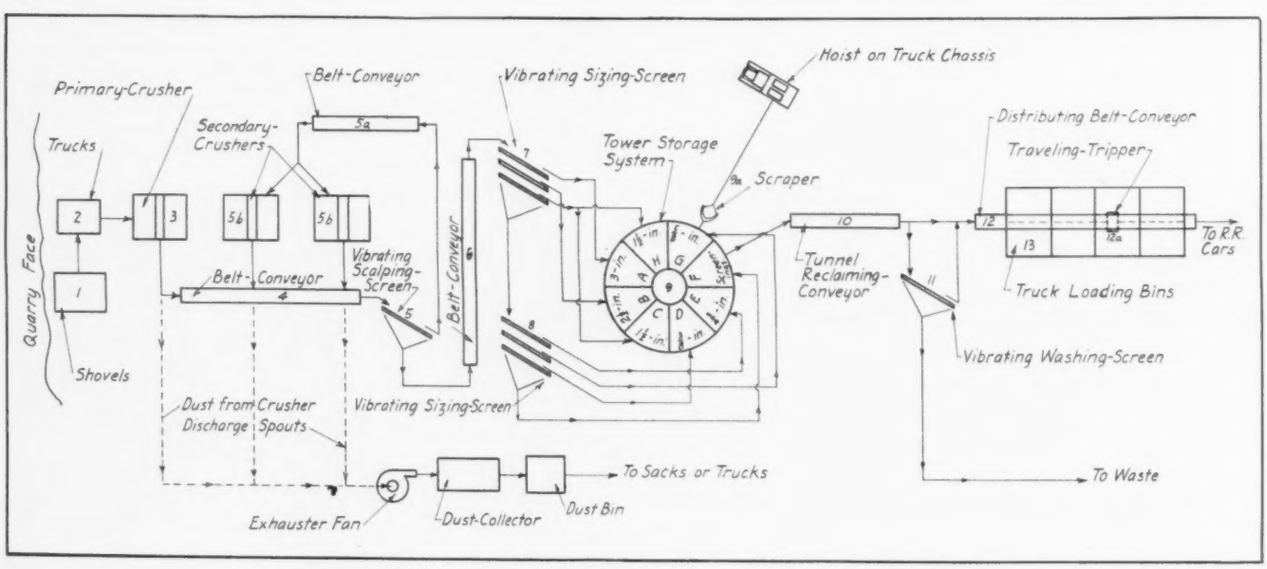
The live-stored materials are discharged through Telsmith hand-operated arc gates to a 24-in. reclaiming belt-conveyor in a tunnel under the tower. If desired, sizes can be accurately mixed in loading this conveyor. These hand-operated gates will later be replaced with motor-operated gates which will be controlled from the washer building. The conveyor is inclined and emerges from the tunnel through the center of the screenings storage-compartment.

At the top of the washing-and-loading structure this belt-conveyor discharges through a split chute in either of two optional flows. If the material is to be washed, it is fed to a Niagara 4-ft. by 8-ft. single-deck vibrating screen having $^{5}/_{32}$-in. round perforated plate and 4 Binks spray nozzles. The fines and the water are flumed to waste and the washed material goes to a 24-in. horizontal belt-conveyor over the truck-loading bins. If washing is not required, the reclaiming belt-conveyor discharges the material direct to the horizontal belt. A Robins hand-operated movable tripper can discharge to any of the 8 compartments of the bin or over the end of the bin through a chute direct to railroad cars. The Butler steel bin has a total capacity of 500 tons and is used only for truck loading. Lever-operated sliding gates are used under each compartment. Truck shipments are weighed on a 50-ton capacity R. S. Meyer Co. truck-scale at the plant office.

A Byers gasoline crawler crane with an Owen clam-shell bucket is used for general clean-up purposes about the plant. Another similar unit was used in erecting the plant and is now being employed for the same purpose at the asphalt plant. Water for washing the stone is furnished by a 4-in. LaBour self-priming centrifugal pump driven by a 20-hp. electric motor. The water for cooling the crusher bearings is supplied by a 2-in. LaBour pump driven by a 3-hp. motor. The water is obtained from the old Delaware and Raritan Canal, now owned by the Pennsylvania Railroad but abandoned for commercial purposes, which passes the plant. An old stone building near the plant is being used as a machine and repair shop and contains the usual equipment, such as a forge, drill, etc. A Lincoln "Stable-Arc" electric welder, which was used in the erection of the plant, is also kept in the shop.

The dust-collecting unit previously mentioned is a development of the Research Corp., New York, N. Y., and was designed especially for this type of application. It is said that, under average operating conditions, most of the dust created in crushed-stone plants comes from the fracturing of the stone. This system is intended by its designers to collect the dust when it is made, rather than to wait until it is liberated to the atmosphere in various parts of the plant.

In this particular plant the utilization of the dust was the main purpose for which the collecting system was installed, although the protection of bearings, motors, etc., and the savings in not having to wash the finished stone were important considerations. Because of the open design of the plant and its isolated location, neither the health hazard nor



Flow-sheet of the plant of the Kingston Tray Rock Co., Kingston, N. J.

the damage to adjoining properties was in itself a sufficient reason for its installation.

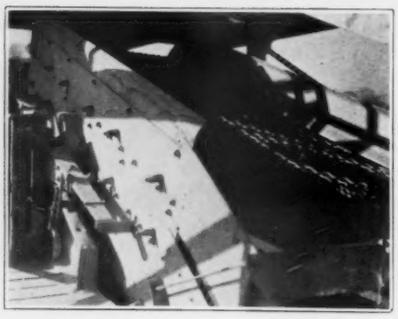
Before the dust-collecting system was installed preliminary observations were made to determine the most advantageous point at which the dust could be collected. Tests were made to determine the percentage of "fines" generated at various points and the percentage of "fines" in the finished products, also the degree of fineness in each case.

As the result of these tests it was decided to install three Aërohoods, one at each crusher. These Aërohoods are essentially inclosed chutes connecting each crusher discharge opening with the main conveyor. A series of inclined shelves cascade the stone as it drops, allowing it to aërate. Air drawn through the Aërohoods at high volume sweeps the dust off the stone. This system also traps the air under the crushers, placing them under suction and carrying the dust away from the stone directly as it is crushed. Dust lines connect the three hoods with the Buffalo Forge Co., Size 70, Type M, standard mill-exhauster-type fan which creates the suction. This fan has a capacity of 20,000 cu.ft. of air per min. against a static pressure of 8 in. The system is so arranged that a proportionate amount of air is drawn from each hood. The dust-laden air passes from the fan through a 30-in. pipe to a series of Multiclone centrifugal-type dust-collectors mounted on a steel frame-work above the plant. The cleaned air is exhausted to the atmosphere and the collected dust is discharged to a steel storage-bin where it can be either bagged or loaded in bulk into trucks. Most of this dust will be used as a filler for asphalt-paving mixtures and roofing.

The tests preceding the installation of this system indicated that about 5 tons of dust would be collected in an average day, but that in dry weather as much as 15 tons daily might be expected. As this

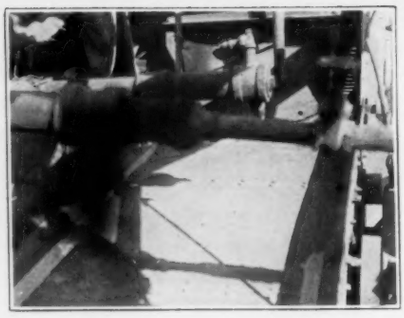
TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE KINGSTON TRAP ROCK CO., KINGSTON, N. J.
(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Stripping		Shovel Trucks (as required)				
Drilling and blasting		Well drills (2) Jackhammers Air compressor	Armstrong Keystone Ingersoll-Rand Ingersoll-Rand	6-in. wire rope 6-in. rope Portable	Buda gasoline engine Buda gasoline engine	
Loading and transportation to plant	1 2	Shovels (2) Trucks (4)	Marion Marion Mack	2-cu. yd., electric 1½-cu. yd., electric 6-ton, steel dump		
Primary crushing and scalping	3 4 5 6	Jaw crusher (From 3 and 5b) Belt-conveyor Vibrating screen (Oversize to 5a; throughs to 6) (From S) Belt-conveyor (To 7)	Farrel-Bacon Robins Robins Gyrex Robins	60 by 42-in. 36-in. by 90-ft. centers 5 by 12-ft., single-deck 24-in. by 116-ft. centers	200-hp. G. E. motor 20-hp. G. E. motor 10-hp. G. E. motor 30-hp. G. E. motor	Allis-Chalmers Texrope Goodyear Emerald Cord V-belt Allis-Chalmers Texrope Allis-Chalmers Texrope
Secondary crushing	5a 5b	Belt-conveyor Jaw crushers (2) (To 4)	Robins Farrel-Bacon Farrel-Bacon	30-in. by 58-ft. centers 36-in. by 24-in. No. 15B 24-in. by 13-in. Type B	7½-hp. G. E. motor 100-hp. G. E. motor 50-hp. G. E. motor	Allis-Chalmers Texrope Allis-Chalmers Texrope Allis-Chalmers Texrope
Sizing	7 8	Vibrating screen (Top-deck oversize to A bin of 9; middle-deck oversize to B bin of 9; bottom-deck oversize to C and H bins of 9; bottom-deck throughs to 8) Vibrating screen (Top-deck oversize to E bin of 9; middle-deck oversize to G bin of 9; bottom-deck oversize to D bin of 9; bottom-deck throughs to F bin of 9)	Robins Gyrex Robins Gyrex	5 by 12-ft., triple-deck 5 by 12-ft., triple-deck	10-hp. G. E. motor 10-hp. G. E. motor	Allis-Chalmers Texrope Allis-Chalmers Texrope
Storage	9 10 9a 	Storage tower Bin gates (8) Belt-conveyor (To 11 or 12) Drag-scraper Movable tower	Kern system Smith Engineering Telsmith Robins Sauerman 	8 compartments, 1,800 ton total live storage capacity, 200,000 ton total capacity 24-in. by 160-ft. centers 1½-cu. yd. Crescent scraper Hoist on gasoline-truck chassis	 20-hp. G. E. motor Electric motor	 Goodyear Emerald Cord V-belt
Washing	11 12 12a	Vibrating screen Belt-conveyor (To 13 or cars) Traveling tripper (To 13 or cars)	Niagara Robins Robins	4 by 8-ft. single-deck 24-in. by 87-ft. centers, horizontal Hand-operated	2-5-hp. G. E. motors 10-hp. G. E. motor	Allis-Chalmers Texrope Allis-Chalmers Texrope
Loading	13	Bins (8) Gates (8) (To trucks) Truck scale	Butler Butler R. S. Meyer Co.	500-ton total capacity Sliding, lever-operated 50-ton capacity		
Dust-collection		Dust connections Exhauster fan Dust-collector Storage-bin (To bags or trucks)	Research Corp. Aerohoods Buffalo Research Corp. Multiclone	 Type M; size 70, 20,000 c.f.m.	 G. E. motor	 Direct
Water-supply		Pumps (2)	La Bour La Bour	4-in. centrifugal 2-in. centrifugal	20-hp. motor 3-hp. motor	Direct Direct



One of the triple-deck vibrating sizing screens over the storage-tower.

Conveyor from primary crusher and single-deck scalping screen.



The single-deck vibrating washing screen and some of the spray nozzles.

stone is of the hard trap variety, which does not dust very freely, it is claimed that even better results can be expected where the rock is softer and gives more dust. In this plant the removal of dust is accomplished so effectively that no washing is required to enable the product to pass even the strictest specifications. The dust-collector building is now being inclosed.

The plant is entirely electrically operated, with the exception of the well-drills, compressor and several small shovels and cranes. Power is received at 4,150 v. and is reduced to 440 v. for all the motors at an outdoor substation. Another transformer reduces it to 110 v. for the lights. In order to secure the best possible power rates most of the loading and crushing is done at night.

All the motors and other electrical equipment in this plant were furnished by the General Electric Co., the crushers by Earle C. Bacon, Inc., and the vibrating scalping and sizing screens, the belt-conveyor idler and drive pulleys by the Robins Conveying Belt Co. which also furnished all the Robins "Everwear" conveyor belting. All the vibrating screens are equipped with Robins Gyraloy and Super Gyraloy screen cloth.

When the crushed-stone plant was designed and erected allowance was made for the later addition of an aggregate-bituminizing plant which will use much of the dust produced. This plant, which will be operated under the name of the Kingston Bituminous Products Co., is now under construction and will be in operation about March 15. It was designed by the F. D. Cummer & Son Co., Cleveland, O., and will have a capacity of 60 tons per hr. Any type of hot or cold mix can be made.

The crushed stone used in this plant is discharged from the stone plant loading belt-conveyor by the tripper into two 150-ton steel bins alongside the truck-loading bins. The stone is discharged from these bins to a conveyor which can take it to a 50-ft. drier and cooler if necessary. If the stone is dry enough it is passed around the drier to an elevator feeding a screen, which discharges it to a 5-compartment 125-ton bin over the mixing plant. The bin discharges into a weighing hopper which feeds a 2-ton Cummer mixer from which the finished product can be loaded into either trucks or railroad cars. Two 10,000-gal. storage-tanks can be used for either asphalt or tar. Steam is supplied by a 150-hp. Economic boiler and this, with the drier-cooler, is fired with bunker oil.

L. R. Gilbert, owner of the Kingston Trap Rock Co. and the Kingston Bituminous Products Co., also owns Linus R. Gilbert, Inc., Plainfield, N. J., contractors. Mr. Gilbert has done much important sewer-construction work in the East but is now devoting all his time to his crushed-stone business.

Silica Plant (*from page 27*)

and tailing conveyor require 12 kw.-hr. per ton of material ground. With this type of installation it is possible to obtain favorable rates on a power tariff based on an 80-per cent. load factor, so that the rate becomes $0.0126 per kw.-hr. On this basis the theoretical load factor is 85.2 per cent., allowing 5.2 per cent. for periods when the load may be off the line during regularly-scheduled operation. Hence, with the load factor of 80 per cent., and basing the grinding on 99 per cent. through 200-mesh, the total power cost for the operation of the entire plant is $0.83 per ton of material ground. When a product of 97 per cent. through 200-mesh is ground, the power cost is $0.72 per ton. This compares with a former power cost of $1.75 per ton for grinding 97 per cent. through 200-mesh and $1.95 for 99 per cent. through 200-mesh.

In addition to power savings there is much less equipment in operation, fewer moving parts, and the cost of maintenance is estimated to be only about one-half of that required by the old equipment. The labor cost also is moderate, inasmuch as, on a basis of 40 tons per day, only two men working 8 hr. are needed to unload the incoming cars of raw material. Three men working shifts of 8 hr. each operate the machinery, making a total labor requirement for a production of 40 tons per day of 40 man-hr., or about half that required for equal tonnage handled with the former equipment. These tangible savings, coupled with improved working conditions through the complete elimination of dust, have amply proved the wisdom of modernizing grinding operations of this type.

Since the development of new uses for fine silica sand, slate, talc, etc., mining companies are installing grinding plants at the mines to prepare the product to suit and to encourage these new customers, and in some instances are even going so far as to build plants to manufacture new material in which their product is used, with considerable profit to themselves. On material such as slate the grinding plant assumes the rôle of a salvage unit.

Premixed-Concrete Men Favor Petition for Direct Cement Purchasing

Object to Paying Dealers Commissions When These Render No Useful Service

PRODUCERS of premixed concrete met at the Netherland Plaza Hotel, Cincinnati, O., on Saturday, Jan. 27, to discuss the progress being made on the fair-competition code of their industry and other related subjects. This was announced as an open and joint meeting of the board of directors of the National Ready Mixed Concrete Assn. and of the code committee of the industry. A small but representative group of producers, including many members of the association, attended. Association affairs received no attention at this meeting and the present officers are held over until further notice. H. F. Thomson, president of the association and vice-president of the General Material Co., St. Louis, Mo., presided.

After introductions had been made all around Stanton Walker, director of engineering of the association, stated that the completed code of industry, which is awaiting the signature of Administrator Johnson, is being delayed because of a small provision on clerical hours. By unanimous vote it was agreed to reduce these hours. Charles P. Maloney, president of the Maloney Concrete Co., Inc., Washington, D. C., who has been active in the formation and presentation of the code, stated that, with this change made, the code should be approved at an early date. Mr. Thomson then briefly discussed the work of the association for the past nine months on the code and pointed out some of the advantages of a separate code for the industry.

J. E. Burke, general manager of the Ready-Mixed-Concrete Division, J. K. Davison & Bro., Pittsburgh, Pa., and chairman of the Temporary Code Committee, then mentioned a few phases of the code work and read a list of the members of this committee, which he stated would become the Temporary Code Authority as soon as the code is approved. A list of the members of the authority follows:

TEMPORARY CODE AUTHORITY

J. E. Burke (chairman), Ready-Mixed-Concrete Div., J. K. Davison & Bros., Pittsburgh, Pa.

Arthur C. Avril, Avril Tru-Batch Concrete, Inc., Cincinnati, O.

W. B. Brooks, Jr., Arundel-Brooks Concrete Corp., Baltimore, Md.

Alexander Foster, Jr., Warner Co., Philadelphia, Pa.

A. G. Gull, Transit Mix Concrete Corp., New York, N. Y.

Charles P. Maloney, Maloney Concrete Co., Washington, D. C.

E. S. Simpson, Super Concrete Corp., Washington, D. C.

V. P. Ahearn, National Ready Mixed Concrete Assn., Washington, D. C.

Stanton Walker, National Ready Mixed Concrete Assn., Washington, D. C.

H. F. Thomson, holdover president of the association.

J. E. Burke, chairman of Temporary Code Authority.

Stanton Walker again took the floor and discussed the code provisions on the hours of labor and their relation to the peculiar problems of this industry. The wage provisions, he stated, are similar to those in the builders' supply code, which at that time had not yet been approved, rather than to those in the aggregates code because of the fact that most of the business of ready-mixed-concrete producers is done in metropolitan areas.

It was unanimously voted that the Temporary Code Committee should go on with its work. Suggested methods for the election of the permanent code authority were then discussed, as were also methods for apportioning the expense of the code's formulation and administration.

Mr. Walker then brought up the subject in which most of those present were mainly interested, Sec. 2 of Article XI of the Code of Fair Competition of the cement industry which is being actively opposed by the builders' supply industry and is now being reconsidered by the National Recovery Administration. Sec. 2 of this article establishes the mandatory policy of selling cement direct to "commercial concrete-mixing plants for their own processing operations, but not for resale." Provision is also made for direct sale in other important cases. As a result of the protests of material dealers Article XI was temporarily suspended by the administrator and later reinstated pending the outcome of a public hearing which was held on Jan. 15 and is reported on elsewhere in this issue. Due to the facts that the association has been urging the cement industry to sell direct to ready-mixed-concrete producers and that many communications from producers on this subject have been received Mr. Walker appeared as a witness at

that hearing and made a statement in support of the article in the code as written. After a day-and-a-half session the hearing was recessed subject to reöpening by the administrator on forty-eight hours' notice. Mr. Walker stated that in his opinion cement producers can sell to the industry as they see fit until a final decision is rendered.

There was considerable discussion among the ready-mixed-concrete producers present, some of whom are also building-supply dealers, on this subject and its effects on the industry. In spite of conflicting viewpoints, however, it was decided to approve Mr. Walker's plea to the N. R. A. on this subject. The meeting also voted approval of a motion asking the N. R. A. to consider the ready-mixed-concrete industry as a direct purchaser of cement in order to prevent unfair advantages within the industry. A discussion on the trucking code as it affects the industry followed. Extracts from Mr. Walker's statement to the N. R. A. in support of Article XI of the cement-industry code follows:

The ready-mixed-concrete manufacturer is an important customer of the cement industry's products. The industry is relatively new, having grown from practically nothing in about 1925 to some 300 to 350 operators who purchased approximately 5,000,000 bbl. of cement during 1932, when construction was at a low ebb. In previous years a smaller number of companies purchased in the neighborhood of 10,000,000 to 12,000,000 bbl. of cement. This cement was purchased in relatively-large lots, and, while some proportion of it was handled through dealers, in practically no case was any necessary service rendered by them. The average mixed-concrete operator is fully equipped to stock relatively large quantities of cement and other materials and does not require the materials-handling service of the dealer.

Organizations engaged in the manufacture of ready-mixed concrete fall into four principal classifications, as follows:

1. Those engaged solely in the manufacture and sale of ready-mixed concrete.
2. Those owned by, or allied with, producers of sand and gravel, or crushed stone, or slag—important constituents of concrete.
3. Those owned by or allied with dealers in the building-supply trade.
4. Those owned by, or allied with, companies which are both producers of materials and dealers in the building-supply trade.

The latter two classifications form an important part of the industry, but the numbers in them do not represent a substantial majority of the industry. Fair competition can exist only if all members of the industry are permitted to purchase cement and other materials on the same basis. It will be recognized at once that this condition would not exist if certain members of the ready-mixed-concrete industry were required to purchase cement through the dealer because they were not dealers.

If cement were sold through the dealer to those ready-mixed-concrete manufacturers who are not dealers, there would be an immediate advantage of 25 to 75 c. per cu. yd. of concrete (in the cost of manufacture) to the operator owned by or allied with a dealer. This would create a monopoly for the members of the industry falling into the two latter classifications, previously outlined, and would also extend a strong invitation for other ready-mixed-concrete manufacturers to enter the dealer field. That the unfairness of such competitive relationships is recognized by the industry is well demonstrated by the following excerpt from the Code of Fair Competition for the Ready-Mixed-Concrete Manufacturing Industry, which is now in the hands of the National Recovery Administration:

> The cost of purchased ingredients of the concrete shall be taken as the invoice price thereof. Where one or more of the ingredients for the concrete are manufactured by a member of the industry, their cost shall be taken as the regular sales price quoted for such ingredients for sale to others at the same point of delivery and under similar conditions of sale.

The ready-mixed-concrete manufacturer performs for the consumer a function essentially the same as that performed by the dealer in that he purchases the ingredients for concrete and sells them direct to the consumer in the form of mixed concrete ready for use. He is in direct competition with the seller of the separate ingredients and, if he is required to *purchase* his materials at the same price at which his competitor *sells* them, he is being discriminated against and can not long survive in the face of such competitive practices.

A homely illustration affords a good analogy. If the baker of bread were required to buy his flour from the corner grocer, he would be in the same position as the ready-mixed-concrete operator required to purchase his cement through a dealer.

Certain ready-mixed-concrete manufacturers have found it to their advantage, on account of special conditions surrounding their operations, to purchase cement through dealers. That advantage comes from some service rendered by the dealers to these particular operators, either in the handling of the materials or in the sale of the product. For reasons peculiar to specific operations and which have no general application that condition will continue to exist in many cases, and when it does, the dealer is entitled to a fair charge for his service. But where no service is rendered, there is no justification for the payment of an arbitrary tribute.

The construction industry is recognized as a most important factor in restoring the purchasing power of our nation. If it is to play the role assigned to it, economic waste must be eliminated at every point. The payment of a commission to a middleman who renders no service can not be classified as other than economic waste.

REGISTRATION

Producers

Avril, Arthur C., Avril Tru-Batch Concrete, Inc., Cincinnati, O.

Bird, Paul P., Boston Sand & Gravel Co., Cambridge, Mass.
Burke, J. E., Ready Mixed Concrete Div., J. K. Davison & Bros., Pittsburgh, Pa.
Butterworth, A. C., General Material Co., St. Louis, Mo.

Campbell, J. A., Ready Mixed Concrete Corp., Minneapolis, Minn.
Compton, R. L., Avril Tru-Batch Concrete Co., Cincinnati, O.
Cook, George W., Ready Mixed Concrete Co., Covington, Ky.
Cooper, G. W., Cooper Supply Co., Detroit, Mich.

Gauntlett, George W., Pioneer Sand & Gravel Co., Seattle, Wash.

Haines, C. E., Mixed Concrete Co., Columbus, O.
Howard, Walter E., Howard Concrete Producing Co., Cincinnati, O.

Kimmel, A. W., Ready Mixed Corp., Dayton, O.
Kling, J. D., Metropolitan Concrete Co., Cleveland, O.

Maloney, Chas. P., Maloney Concrete Co., Washington, D. C.
McCracken, Jas. F., American Builders Supply Co., Louisville, Ky.
Miller, F. J., Ready Mixed Concrete Co., Covington, Ky.

Richter, Louis, Richter Concrete Corp., Cincinnati, O.
Riehl, George H., Avril Tru-Batch Concrete Co., Cincinnati, O.

Shiely, J. L., Guaranteed Concrete Co., St Paul, Minn.
Sullivan, John B., Liberty Corp., Philadelphia, Pa.

Thom, L. G., Ready Mixed Concrete Corp., Richmond, Va.
Thomson, H. F., General Material Co., St. Louis, Mo.

Warner, Julius J., Richter Concrete Corp., Cincinnati, O.
Wilson, R. S., Big Rock Stone & Material Co., Little Rock, Ark.

Associate Members and Guests

Connar, V. N., Universal Atlas Cement Co., Pittsburgh, Pa.
Guilfoil, D. D., Sauerman Bros., Inc., Chicago, Ill.
Hayden, H. B., Jaeger Machine Co., Columbus, O.
Huntington, C. S., Link-Belt Co., Chicago, Ill.
Kiefer, L. O., Universal Atlas Cement Co., Pittsburgh, Pa.
McClure, J. C., Universal Atlas Cement Co., Pittsburgh, Pa.
Rockwood, Nathan C., *Rock Products*, Chicago, Ill.
Trauffer, W. E., Pit and Quarry, Chicago, Ill.
Walker, Stanton, National Ready Mixed Concrete Assn., Washington, D. C.

MEN OF THE INDUSTRY

FORD J. TWAITS

FORD J. TWAITS, president of the Consolidated Rock Products Co., Los Angeles, Cal., and its subsidiaries since March, 1930, was born at Lansing, Mich., and received his degree in civil engineering at Michigan State University in 1908. Coming to Los Angeles in 1912 he engaged in structural engineering as Twaits and Carroll. During 1918 and 1919 he was chief engineer for the Pacific Marine Construction Co., and supervised the construction of concrete ships for the government. From 1920 to 1929 he was vice-president of Scofield-Twaits Co., contractors, and erected some of the principal buildings in Los Angeles. During 1929 he was executive vice-president of the Consolidated Steel Corp. Mr. Twaits is a director of the National Sand & Gravel Assn. and a member of the Code Authority of the mineral-aggregates industries.

Personal Mention

A. G. Pratt, president of Babcock & Wilcox Co., has been elected to the board of directors of the Worthington Pump & Machinery Co.

Frank M. Young has been appointed as the sales representative of the Poole Foundry & Machine Co., in Milwaukee, Wis., and vicinity.

Prof. Fred Finkeldey of Germany, one of the pioneers in the manufacture of high-silica cement, recently made an extensive visit to the plant of the Santa Cruz Portland Cement Co., Santa Cruz, Cal., to get new ideas for the manufacture of this product. He is said to represent large cement-manufacturing interests in Germany.

J. L. Torphy, former president of the Shawnee Stone Co., has accepted a position as manager of the Empire Stone Co., near Bloomington, Ind. Irvin S. Mathews has resigned as head of the company to devote more time to other business interests.

Sewell L. Avery, president of the United States Gypsum Co., Chicago, Ill., and of Montgomery Ward & Co., has been elected to the board of directors of the Nash Motors Co.

James S. Adams, vice president and assistant to the president of the Johns-Manville Corp., has resigned to join the firm of Benton & Bowles.

W. Jess Brown has been elected vice president of the Dixie Sand & Gravel Corp., Chattanooga, Tenn., a subsidiary of the Pennsylvania Dixie Cement Corp., to fill the place left vacant by the recent promotion of W. H. Klein.

Paul M. Nauman, general manager of the Dubuque Stone Products Co., Dubuque, Ia., has been elected president of the Dubuque Traveling and Business Men's Assn.

Louis B. Bray has been made assistant general and office manager of the Dubuque Stone Products Co.

Addis E. McKinstry was elected president of the International Harvester Co. to succeed the late Alexander Legge.

C. Raymond Messinger, chairman of the board, Chain Belt Co., Milwaukee, has resumed the office of president left vacant by the recent death of his brother, Clifford F. Messinger.

George K. Viall has been elected a director of the Chain Belt Co.

Forrest U. Webster, advertising manager, Cutler-Hammer, Inc., Milwaukee, for the past seven years, has been advanced to manager of merchandising sales. He also will continue to exercise supervision over advertising. Mr. Webster is the immediate past-president of the National Industrial Advertisers Assn.

W. C. Stewart of Calera, Ala., former general superintendent of the Longview Lime Works and the Saginaw Lime & Stone Co., has been chosen national employment service officer for Shelby County, Ala.

Obituary

Wm. A. Guthrie, 70, for 20 yr. secretary of the Stone & Quarrymen's Assn. of North America, died Jan. 11 at his home in Mamaroneck, L. I., N. Y. He had retired from active connection with the association 15 yr. ago.

Harry Schwartz, superintendent of the Trap Rock, Pa., quarries of the John T. Dyer Quarry Co., died Dec. 31 from heart trouble aggravated by injuries received some months ago. Mr. Schwartz first entered the employ of this company 40 yr. ago, when the quarry was first opened, and had been with the firm continuously since.

Alexander D. Clarke, 81, retired expert in cement manufacture, died recently at his home in Napa, Calif. He had been connected with a cement company which operated first at Napa Jct. and later at Santa Cruz, Calif.

John J. Manning, 60, president of the Manning & Locklin sand and gravel plants, Detroit, Mich., died Jan. 14 in that city. He was also president of Manning Bros., Inc., commercial photographers.

E. O. Wattis, 78, president of Six Companies, Inc., builders of Boulder Dam, died Feb. 3 at his home in Ogden, Utah, of heart disease. He is the third president of this company to die since construction of the dam was begun. His brother, Wm. H. Wattis, first president of the company, died late in 1931, and his successor, W. A. Bechtel, died a few months ago.

Frank W. Kennedy, 57, vice president and general manager of the De Laval Steam Turbine Co., Trenton, N. J., died at his home in Yardley, Pa., on Jan. 24.

W. T. Radcliffe, 72, pioneer contractor and quarry operator, died Jan. 5 at a hospital in Alton, Ill.

A. R. Gilmore, 59, general manager of the Pine Creek Lime & Stone Co., Jersey Shore, Pa., died Feb. 1 from a heart attack.

▼ *Coming Events* ▲

February 16, 1934, New York, N. Y.—Meeting of the American Section of the Society of Chemical Industry, Chemists Club, 52 East 41st St, New York City.

February 19-22, 1934, New York, N. Y.—143rd meeting of the American Institute of Mining and Metallurgical Engineers. Engineering Societies Bldg., 29 W. 39th St., New York City.

In the description of the plant of T. C. Hubbert & Co., Wilmington, Del., which was published in the January, 1934, issue of Pit and Quarry, mention was not made of the fact that Audubon Wire Cloth Co. screen cloth is used on the vibrating screens in this plant.

The Thompson-Hayward Chemical Co., Kansas City, Mo., is reported to have purchased the plant and equipment of the Rex Lime & Sulphur Co., also of that city. Lime and sulphur solutions are made at this plant.

New Incorporations

ILLINOIS MINERALS CO., 607½ Washington Ave., Cairo, Ill. Liquidated and acquired assets of International Silica Co. A. M. Davis, J. E. Curtis, Ethel Davis.

PACIFIC ROCK & GRAVEL CO., P. O. Box 243, Los Angeles, Cal. 11,000 shares. T. B. Peters, W. H. McCune, Jr.; Frank L Moore, Alhambra, Cal.

TRAVERTINE PRODUCTS CO., Twin Falls, Ida. F. P. Van Hook, Boise, Ida.; W. G. Shipment; C. R. Shipment.

TRUX-MIX CONCRETE CO., Dallas, Tex. Capital $6,000. L. L. Dent, W. B. Palmer, and P. W Gifford.

HEUMADER QUARRIES, INC., R. F. D. No. 6, St. Joseph, Mo. Re-incorporation of Heumader Quarries. Capital $5,000. Wm. P. Heumader, Florence Heumader, and R. S. Tracie.

EMPIRE SLATE CORP., Granville, N. Y. 100 shares n.p.v. Owen D. O'Brien; W. Harry Williams, Poultney, Vt.; Russell I. Williams, Poultney, Vt.

SOUTHERN FLAGSTONE CO., Chattanooga, Tenn. Capital $25,000. John W. Blevins, H. P. Colvard and others.

ADVANCE ROCK CO., INC., Los Angeles, Cal. J. S. McGlauflin, E. G. McGlauflin, and Oliver W. LaChappell, all of Los Angeles.

ASHEVILLE QUARRY CO., Asheville, N. C. Capital $10,000. F. J. Fanning, Katherine C. Fanning, and A. H. Bizzell, all of Asheville.

Aggregates Statistics

By H. H. HUGHES, M. ALLAN and A. T. COONS

Bureau of Mines, Department of Commerce

PRODUCTION of sand and gravel and crushed stone by units of government for their own use has been common practice for years. Prior to 1931, however, the production of either sand and gravel or crushed stone reported to the Bureau of Mines by states, counties, municipalities, or other governmental agencies amounted to only about 10 per cent., or less, of the total quantities accounted for. This situation was not alarming to operators of commercial plants, and little thought apparently was given to it; in fact, it is doubtful whether the exact conditions were realized, because the statistics of the Bureau of Mines for those years were not tabulated to show this breakdown.

During 1933, when it was found that 28.9 per cent. of all the sand and gravel and 16.8 per cent. of all the crushed stone produced in 1932 had been reported by governmental agencies, steps were taken immediately by the Bureau of Mines to segregate this material from that produced at commercial plants. Furthermore, in order to provide a statistical background for 1932 figures, a retabulation was made for the four previous years. A preliminary statement already has been published,[1] but the subject warrants further elaboration and consideration.

The terms "commercial" and "noncommercial" have been used in setting up tables which segregate production by units of government. The figures for "noncommercial operations" represent tonnages reported by states, counties, municipalities, and other government agencies produced either by themselves or by contractors expressly for their consumption, in some instances with publicly-owned equipment. They do not include governmental purchases from commercial producers. The figures for "commercial operations" represent tonnages reported by all other producers, including relatively-small quantities of railroad ballast and fill produced directly by railroads for their own use.

A summary of the tabulations made on this basis is given in Table I and is portrayed graphically in Fig. 1. The most striking feature of these data is the increase of noncommercial production in years during which commercial production declined sharply.

Statistics Inadequate.—These statistics are by no means complete. Each year the Bureau of Mines sends schedules to all known commercial producers, and separate blanks to units of government that are known or thought to be producers of aggregates. The return of these schedules is purely voluntary, and within the commercial industry coöperation is reasonably good. Many governmental agencies, however, find it impossible to supply the information requested, regardless of good intentions. A parallel situation was encountered by the United States Bureau of Public Roads, which was forced eventually to discontinue its estimates of secondary-road construction because of inadequate data. Obviously, if county or state highway and road officials are unable to report the number of miles of roads built, they can not be expected always to determine the tonnage of materials used in their construction.

[1] PIT AND QUARRY, December 1933, pp. 41.43.

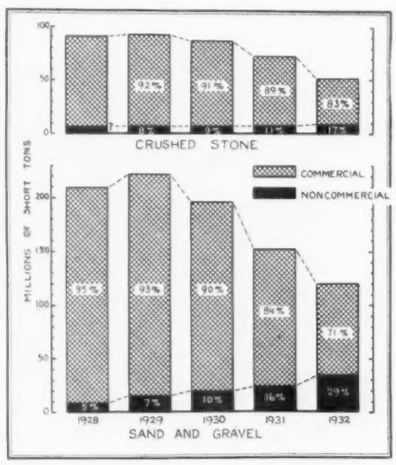


Fig. 1. Crushed stone and sand and gravel sold or used by commercial and noncommercial producers, 1928 to 1932.

Complete statistical coverage of aggregates production by states, counties, and municipalities is impossible without a field staff. As a result, reports of noncommercial production may not be received from strictly comparable sources each year. A careful check reveals that about half the increase in noncommercial production in 1932 might be attributed to agencies making no reports in 1931. What percentage of these agencies may not have produced aggregates in 1931 can not be determined. Most of the increase, however, apparently was due directly to local activity in road-construction projects designed to relieve unemployment. For example, notable increases in the noncommercial production of sand and gravel in 1932 were recorded in Colorado, Idaho, Iowa, Montana, New Mexico, North Dakota, Rhode Island, Tennessee, and Washington.

Portable Plants Difficult to Canvass.—It obviously is difficult to collect statistics from portable-plant operators. They may move many times during a season, and in some sections of the country they may be inactive during January and February, when annual schedules commonly are mailed. The production of many such plants may be included under noncommercial operations, because units of government are asked to report as noncommercial any material produced by contractors directly for their use. Some portable plants, of course, are covered by a direct canvass, but the production of a great many others doubtless is not included among the statistical returns. A complete coverage of these operations would aid materially in completing the statistical picture of the aggregates industries.

Table I.—SAND AND GRAVEL AND CRUSHED STONE SOLD OR USED IN THE UNITED STATES BY COMMERCIAL AND NONCOMMERCIAL OPERATORS, 1928-1932 (*a*).

Year	Commercial Operations		Noncommercial Operations (*b*)		Total Accounted For	
	Quantity (*short tons*)	Change From Year Before (*per cent.*)	Quantity (*short tons*)	Change From Year Before (*per cent.*)	Quantity (*short tons*)	Change From Year Before (*per cent.*)
Sand and Gravel						
1928	199,519,577		9,599,231		209,118,808	
1929	206,218,734	+ 3.4	16,353,171	+70.4	222,571,905	+ 6.4
1930	176,880,106	−14.2	20,171,620	+23.3	197,051,726	−11.5
1931	128,938,689	−27.1	24,540,355	+21.7	153,479,044	−22.1
1932	85,289,076	−33.9	34,748,821	+41.6	120,037,897	−21.8
Crushed Stone						
1928					91,265,360	
1929	85,409,260		7,312,000		92,721,260	+ 1.6
1930	79,560,890	− 6.8	7,550,000	+ 3.3	87,110,890	− 6.1
1931	64,818,410	−18.5	7,806,000	+ 3.4	72,624,410	−16.6
1932	43,284,190	−33.2	8,710,910	+11.6	51,995,100	−28.4

a The figures for "noncommercial operations" represent tonnages reported by states, counties, municipalities, and other government agencies, produced either by themselves or by contractors expressly for their consumption, often with publicly-owned equipment. They do not include purchases from commercial producers.

The figures for "commercial operations" represent tonnages reported by all other producers, including relatively-small amounts of railroad ballast and fill produced directly by railroad carriers for their own use.

b Part of the apparent large increase in noncommercial production is due to more complete reports in the later years. Even the 1932 figures are probably not complete, as it is often difficult for the local authorities to supply this information.

Table II.—SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN 1931, TABULATED BY REGIONS TO SHOW RELATION OF NONCOMMERCIAL PRODUCTION (*a*).

Regions	Total		Building and Paving (*b*)		Noncommercial (*c*)				Percentage Relationships		
					Total		Washed				
	Quantity (*short tons*)	Value per Ton	Quantity (*short tons*)	Value per Ton	Quantity (*short tons*)	Value per Ton	Quantity (*short tons*)	Value per Ton	(5) of (1) (*d*)	(5) of (3) (*e*)	(7) of (5) (*f*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island)	11,596,489	$0.41	11,005,000	$0.41	8,108,961	$0.29	1,745,811	$0.65	69.9	73.7	21.5
2 (New York)	17,155,174	.62	16,605,000	.61	194,699	.28	12,067	.83	1.1	1.2	6.2
3 (Pennsylvania, New Jersey, and Delaware)	12,679,598	.83	10,927,000	.74	1,195,868	.13	.....	.....	9.4	10.9	.....
4 (West Virginia, Virginia, Maryland, and District of Columbia)	5,401,757	.86	4,555,000	.77	32,000	.80	.....	.....	0.6	0.7	.....
5 (South Carolina,Georgia, Alabama, Florida, and Mississippi)	4,056,994	.48	3,664,000	.49	65,250	*g* .04	.....	.....	1.6	1.8	.....
6 (North Carolina, Kentucky, and Tennessee)	3,403,445	.64	3,002,000	.65	54,820	.79	19,880	.42	1.6	1.8	36.3
7 (Arkansas, Louisiana, and Texas)	12,648,125	.64	11,026,000	.68	91,613	.31	.....	.....	0.7	0.8	.....
8 (Ohio)	8,387,377	.62	6,592,000	.58	175,277	.39	86,127	.58	2.1	2.7	49.1
9 (Illinois and Indiana)	20,389,393	.46	12,657,000	.47	148,625	.77	92,839	.58	0.7	1.2	62.5
10 (Michigan and Wisconsin)	13,316,257	.40	11,296,000	.40	2,402,067	.41	501,060	.40	18.0	21.3	20.9
11 (North Dakota, South Dakota, and Minnesota)	6,955,078	.49	6,115,000	.52	2,667,972	.44	1,252,674	.83	38.4	43.6	47.0
12 (Nebraska and Iowa)	6,507,313	.45	5,834,000	.47	895,017	.18	124,818	.35	13.8	15.3	13.9
13 (Kansas, Missouri, and Oklahoma)	8,638,621	.52	7,912,000	.51	1,137,077	.50	1,101,981	.51	13.2	14.4	96.9
14 (Wyoming, Colorado, New Mexico, Utah, and Arizona)	4,365,056	.58	3,977,000	.61	2,571,058	.56	320,941	.79	58.9	64.6	12.5
15 (California and Nevada)	11,859,772	.61	10,490,000	.64	2,636,206	.56	2,048,115	.58	22.2	25.1	77.7
16 (Montana, Washington, Oregon, and Idaho)	6,118,595	.48	5,124,000	.53	2,163,845	.53	420,772	.71	35.4	42.2	19.4
United States	153,479,044	$0.56	130,781,000	$0.56	24,540,355	$0.40	7,727,085	$0.63	16.0	18.8	31.5

a Compiled by M. Allan, U. S. Bureau of Mines. *b* Includes building and paving sand and gravel, items comparable to those included in noncommercial figures. *c* See explanatory footnotes in Table I. *d* Percentage relation of noncommercial production to total sand and gravel. *e* Percentage relation of noncommercial production to building and paving sand and gravel. *f* Percentage of washed material included in noncommercial production. *g* Represents royalty payment only.

Regional Breakdown of Noncommercial Production.—Regardless of these shortcomings, however, the statistics of the Bureau of Mines are valuable in depicting conditions in the sand-and-gravel and crushed-stone industries. Tables II and III should be of particular interest to all producers.

They summarize the data of the sand and gravel sold or used by producers in 1931 and 1932, tabulated by regions to show the relation of noncommercial production to the total output. Comparable crushed-stone statistics are available only for 1932 and are included in Table III. For those who prefer graphic presentation Figs. 2 and 3 have been compiled from the same data.

Since Table II covers only sand and gravel for the year 1931, it may be well to confine the discussion to Table III, leaving Table II to be used by those who may wish to compare 1932 figures with those of 1931.

Column 1 in Table II lists the total production of sand and gravel by the 16 regions established in the code. The unit values per ton are shown in the next column. Since noncommercial production is limited to building and paving sand and gravel, comparable commercial production totals with their unit values are shown in columns 3 and 4. A summary of the noncommercial production comes next, showing both the total quantity with unit values and the quantity of washed material with unit values.

Pertinent percentage relationships are listed in columns 9, 10, and 11. Column 9 is particularly significant; it shows the percentage of the total sand and gravel in each region represented by noncommercial production. Whereas 28.9 per cent. of total production for the entire country was noncommercial material, wide fluctuations are found in the regional figures. In New England (Region 1), 77.5 per cent. of the total was noncommercial; in New York (Region 2), only 1.4 per cent. As may be expected, production in the western states is heavily weighted by noncommercial material. The map in Fig. 2 brings out these same percentage relationships.

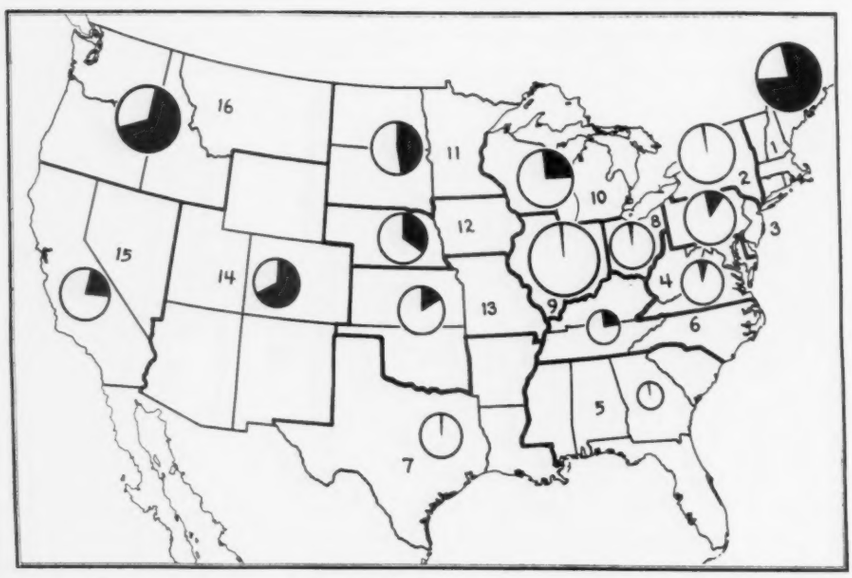


Fig. 2. Sand and gravel sold or used in 1932 by code regions. The area of each circle represents total production, the black sector the percentage of that total reported by noncommercial agencies.

In column 10 a series of percentages are given to show the relation between noncommercial production and comparable commercial production consisting of building and paving sand and gravel. The quantity of noncommercial material that was washed in 1932 was relatively small, only 23.2 per cent for the entire country. The percentages for regions are given in column 11.

Comparable data for crushed stone are summarized in columns 12-15, inclusive. The quantity of noncommercial stone is relatively smaller than that of sand and gravel; only 16.8 per cent. of the total production was noncommercial material. Regionally, however, the fluctuation was wide, ranging from only 1.2 per cent. in Region 7 to 86.6 per cent. in Region 16.

Unit Values.—A comparison of the unit values listed in columns 2, 4, 6, and 8 of Table III reveals interesting relationships. The value of all sand and gravel was 48 c. a ton, that for building and paving sand and gravel was 47 c. a ton, and that for noncommercial material only 29 c. a ton. In general, these values indicate the rela-

tive types of sand and gravel produced. The value per ton of washed noncommercial material was 53 c. a ton, but such material constituted only 23.2 per cent. of the total. As indicated by the value, the rest of the noncommercial production was low-grade pit-run material.

The values vary considerably throughout the regions, especially for the noncommercial material. This is due primarily to the lack of a uniform system of computing value. The noncommercial production in Region 5 for 1931, shown in Table II, is nominally valued at only 4 c. a ton, but this value represented only the royalty payment, and logically should be increased, at least to the extent of adding actual digging costs and certain other charges. Without uniformity of cost-accounting methods no comparison between the values of commercial and noncommercial material can be interpreted as being strictly indicative of the actual cost of the aggregates to the consumer.

No values for the crushed stone produced by noncommercial operations are available.

Future Statistical Programs.—The collection of statistics by the Code Authority is provided for in the code of fair competition for the aggregates industries. It is to be hoped that this work can be correlated closely with the activities of the Bureau of Mines, for the combined efforts of the two agencies should result in valuable additions being made to the statistical history of the sand-and-gravel and crushed-stone industries. The regional committees established in the code should be a decided help in compiling mailing lists and in following up on companies that delay in submitting returns. The Bureau of Mines should have advantages over the Code Authority in collecting certain statistics, particularly with respect to noncommercial production.

No data are yet available to indicate the trend of noncommercial production in 1933. The effects of the P. W. A. and C. W. A. programs are not immediately apparent. In making allotments to projects no provision is included which demands, or even suggests, that aggregates should be purchased from commercial plants. The use of local materials is specified definitely, but any county or municipality may, if its officials see fit, open quarries or pits, even though facilities for sand-and-gravel or crushed-stone production already exist. The expenditure of P. W. A. and C. W. A. funds should reach a peak early in 1934, and the effect upon the aggregates industries will be awaited with interest.

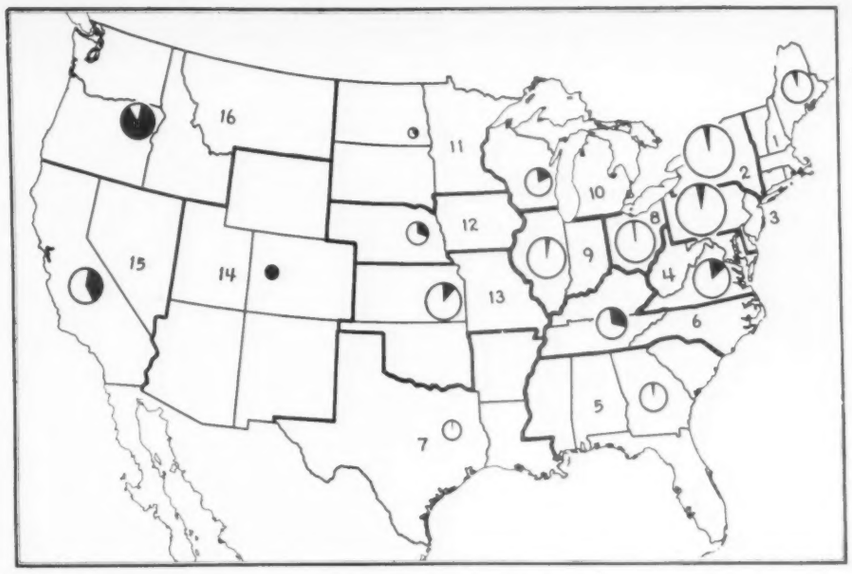


Fig. 3. Crushed stone sold or used in 1932 by code regions. The area of each circle represents total production, the black sector the percentage of that total reported by noncommercial agencies.

Table III.—SAND AND GRAVEL AND CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1932, TABULATED BY REGIONS TO SHOW RELATION OF NONCOMMERCIAL PRODUCTION (*a*).

Regions	Sand and Gravel (*See Fig. 2*)											Crushed Stone (*See Fig. 3*)			
	Total		Building and Paving (*b*)		Noncommercial (*c*)				Percentage Relationships			Total		Noncommercial (*c*)	Percentage Relationships
					Total		Washed								
	Quantity (*short tons*)	Value per Ton	Quantity (*short tons*)	Value per Ton	Quantity (*short tons*)	Value per Ton	Quantity (*short tons*)	Value per Ton	(5) of (1) (*d*)	(5) of (3) (*e*)	(7) of (5) (*f*)	Quantity (*short tons*)	Value per Ton	Quantity (*short tons*)	(14) of (12) (*g*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island)	11,961,918	$0.28	11,543,000	$0.28	9,229,507	$0.20	1,420,122	$0.71	77.5	80.0	15.4	3,029,990	$0.96	168,200	5.6
2 (New York)	9,232,390	.61	8,837,000	.60	125,310	.12	.....	.....	1.4	1.4	.....	7,073,840	1.08	260,670	3.7
3 (Pennsylvania, New Jersey, and Delaware)	8,072,099	.73	6,946,000	.63	1,050,617	.16	34,822	.38	13.0	15.1	3.3	7,221,710	1.04	410,610	5.7
4 (West Virginia, Virginia, Maryland, and District of Columbia)	5,264,261	.86	4,581,000	.80	397,661	.53	325,471	.56	7.6	8.7	81.8	3,900,270	1.01	611,810	15.7
5 (South Carolina, Georgia, Florida, Alabama, and Mississippi)	2,001,030	.46	1,630,000	.48	36,375	.10	.....	.....	1.8	2.2	.....	2,212,280	.84	71,530	3.2
6 (North Carolina, Kentucky, and Tennessee)	3,071,953	.58	2,788,000	.58	747,454	.62	343,591	.59	24.3	26.8	46.0	2,934,030	.85	897,970	30.6
7 (Arkansas, Louisiana, and Texas)	6,262,453	.56	5,430,000	.58	84,000	.69	64,000	.83	1.3	1.5	76.2	1,161,930	.97	14,420	1.2
8 (Ohio)	5,695,546	.60	4,594,000	.55	181,036	.24	61,957	.53	3.2	3.9	34.2	4,876,600	.67	88,950	1.8
9 (Illinois and Indiana)	13,725,699	.44	9,149,000	.44	210,281	.34	22,500	.31	1.5	2.3	10.7	4,322,640	.69	186,940	4.3
10 (Michigan and Wisconsin)	9,089,373	.40	7,857,000	.40	2,330,545	.40	695,343	.45	25.6	29.7	29.8	2,149,710	.74	412,640	19.2
11 (North Dakota, South Dakota, and Minnesota)	7,667,835	.31	6,870,000	.33	3,608,795	.09	1,124,655	.14	47.1	52.5	31.2	381,140	.95	133,970	35.1
12 (Nebrasks and Iowa)	6,788,225	.34	6,289,000	.35	2,320,832	.22	34,374	.25	34.2	36.9	1.5	1,518,230	.87	453,360	29.9
13 (Kansas, Missouri, and Oklahoma)	5,993,834	.55	5,548,000	.54	940,312	.67	883,560	.71	15.7	16.9	94.0	3,612,970	.91	431,480	11.9
14 (Wyoming, Colorado, New Mexico, Utah, and Arizona)	6,175,411	.54	5,939,000	.54	4,081,158	.47	754,080	.58	66.1	68.7	18.5	555,540	.88	544,930	98.1
15 (California and Nevada)	7,583,819	.54	7,108,000	.53	1,730,976	.45	297,229	.73	22.8	24.4	17.2	3,172,000	.84	1,251,960	39.5
16 (Montana, Washington, Oregon, and Idaho)	11,512,051	.30	9,634,000	.33	7,673,962	.27	1,995,744	.52	6.67	79.7	26.0	3,152,010	.80	2,729,170	86.6
United States	120,037,897	$0.48	104,743,000	$0.47	34,748,821	$0.29	8,057,448	$0.53	28.9	33.2	23.2 *h*	51,995,100	$0.90 *i*	8,710,910	16.8

a Compiled by M. Allan and A. T. Coons, U. S. Bureau of Mines. *b* Includes building and paving sand and gravel, items comparable to those included in noncommercial figures. *c* See explanatory footnotes in Table I. *d* Percentage relation of noncommercial production to total sand and gravel. *e* Percentage relation of noncommercial production to building and paving sand and gravel. *f* Percentage of washed material included in noncommercial production. *g* Percentage relation of noncommercial production to total crushed stone. *h* Does not equal the sum of the regional figures because of the omission of a few small items in the State totals. *i* Includes 42,300 short tons produced in Hawaii.

Latest Portland-Cement Statistics

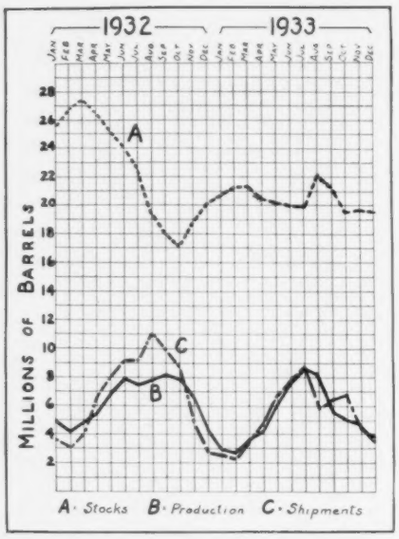


Chart showing monthly production, shipments and stocks on hand at end of month from January, 1932, to December, 1933.

THE Portland-cement industry in December, 1933, produced 3,526,000 bbl., shipped 3,738,000 bbl. from the mills, and had in stock at the end of the month 19,498,000 bbl. Production of cement in December, 1933, showed a decrease of 17.0 per cent. and shipments an increase of 31.9 per cent., as compared with December, 1932. Cement stocks at mills were 3.7 per cent. lower than a year ago. The preliminary totals for 1933 show decreases of 17.4 per cent. in production and 2.7 per cent. in shipments from the final totals for 1932.

In the following statement the total output of finished cement is compared with the estimated capacity of 163 plants at the close of December, 1933, and of 165 plants at the close of December, 1932.

RATIO (*per cent.*) OF PRODUCTION TO CAPACITY

	December		Nov.	Oct.	Sept.
	1932	1933	1933	1933	1933
The month	18.5	15.5	21.2	22.1	25.5
The 12 months ended	28.3	23.6	23.9	24.5	25.5

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1932 AND 1933 (*In thousands of barrels*)

Month	Production		Shipments		Stocks At End of Month	
	1932	1933	1932	1933	1932	1933
January	5,026	2,958	3,393	2,502	25,778	20,624
February	3,971	2,777	3,118	2,278	26,657	21,125
March	4,847	3,684	3,973	3,510	27,545	21,298
April	5,478	4,183	6,536	4,949	26,496	20,542
May	6,913	6,262	8,020	6,709	25,394	20,117
June	7,921	7,804	9,264	7,979	24,043	19,936
July	7,659	8,609	9,218	8,697	22,512	19,848
August	7,835	8,223	10,968	5,994	19,398	22,078
September	8,210	5,638	9,729	6,517	17,878	21,216
October	7,939	5,037	8,743	6,750	17,084	19,502
November	6,462	4,672	4,782	4,463	18,788	a19,709
December	4,248	3,526	2,835	3,738	a20,240	19,498
Totals	76,509	63,373	80,579	64,086	.....	.....

a Revised.

PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1932 AND 1933 (*In thousands of barrels*)

Month	Production		Stocks End of Month		Month	Production		Stocks End of Month	
	1932	1933	1932	1933		1932	1933	1932	1933
January	6,107	3,036	8,184	6,092	July	6,613	8,569	7,889	6,832
February	5,176	3,110	9,375	6,422	August	7,078	7,835	7,175	6,474
March	5,443	4,147	10,025	6,890	September	7,703	5,600	6,708	6,507
April	5,924	4,520	10,511	7,146	October	7,259	4,745	6,093	6,204
May	6,273	5,848	9,922	6,769	November	6,290	4,329	5,938	a5,877
June	6,803	7,836	8,877	6,840	December	4,335	3,390	5,995	5,756

a Revised.

DISTRIBUTION OF CEMENT (*a*)

Shipped to—	November		December		Shipped to—	November		December	
	1932	1933	1932*b*	1933		1932	1933	1932*b*	1933
Alabama	46,722	57,406	32,487	100,482	New Jersey	178,586	148,810	118,506	109,049
Alaska	528	396	82	0	New Mexico	12,752	14,856	7,749	16,139
Arizona	11,747	11,354	4,237	20,199	New York	623,446	401,337	401,481	232,319
Arkansas	b32,310	41,274	18,865	42,488	North Carolina	30,813	44,302	32,762	45,077
California	368,806	418,928	310,038	373,141	North Dakota	3,590	2,410	2,106	3,978
Colorado	30,044	27,782	12,716	24,420	Ohio	248,100	168,128	143,381	140,350
Connecticut	55,588	71,218	29,141	25,078	Oklahoma	119,817	104,154	52,584	100,657
Delaware	28,807	18,440	15,299	13,800	Oregon	19,121	19,693	12,071	19,686
Dist. of Col	88,796	75,016	70,833	36,781	Pennsylvania	b375,171	216,593	237,350	162,376
Florida	31,192	52,151	46,666	63,941	Porto Rico	6,850	7,808	8,675	11,605
Georgia	96,639	88,522	63,730	50,585	Rhode Island	19,367	16,662	13,053	9,852
Hawaii	14,050	10,745	12,323	11,989	South Carolina	10,783	19,739	15,889	17,848
Idaho	6,095	10,378	1,011	7,355	South Dakota	6,325	16,238	4,099	9,320
Illinois	272,348	267,761	98,572	302,131	Tennessee	b162,184	66,645	74,343	82,777
Indiana	76,993	119,603	40,315	94,689	Texas	363,185	224,131	167,779	217,494
Iowa	86,539	62,921	30,264	40,874	Utah	20,118	23,162	5,699	7,313
Kansas	79,749	85,377	38,911	69,184	Vermont	7,026	10,846	3,397	3,461
Kentucky	b88,949	89,705	41,887	73,566	Virginia	57,857	64,199	55,167	68,082
Louisiana	108,552	85,479	64,404	96,860	Washington	45,327	53,916	19,988	36,412
Maine	15,169	12,816	12,436	6,692	West Virginia	43,485	45,933	49,327	42,747
Maryland	101,789	70,027	75,044	64,611	Wisconsin	87,968	75,277	35,093	64,003
Massachusetts	132,313	106,951	84,422	70,212	Wyoming	6,011	7,166	3,201	6,348
Michigan	94,471	106,952	35,907	120,573	Unspecified	*b* 0	87,316	0	24,624
Minnesota	35,044	51,638	24,340	36,845		4,732,008	4,418,776	2,807,573	3,653,348
Mississippi	b79,075	63,345	40,792	49,759	Foreign countries	49,992	44,224	27,427	84,652
Missouri	b158,669	299,324	90,626	157,835					
Montana	5,997	11,216	4,211	10,743					
Nebraska	49,924	56,758	12,014	22,509	Total shipped from cement plants	4,782,000	4,463,000	2,835,000	3,738,000
Nevada	61,177	187,182	27,316	227,041					
New Hampshire	26,044	18,790	4,630	7,448					

a Includes estimated distribution of shipments from two plants in December, 1933; from three plants in November, 1933, and in November and December, 1932.
b Revised.

PRODUCTION AND STOCKS OF CLINKER (Unground Cement), BY DISTRICTS, in DECEMBER, 1932 and 1933 (*In thousands of barrels*)

District	Production		Stocks at End of Month	
	1932	1933	1932	1933
Eastern Pa., N. J., and Md	668	361	552	767
New York & Maine	274	97	336	269
Ohio, Western Pa., and W. Va	552	89	386	543
Michigan	136	179	777	746
Wis., Ill., Ind., and Ky	648	488	532	454
Va., Tenn., Ala., Ga., Fla., and La	540	421	478	416
Eastern Mo., Ia., Minn. and S. Dak	449	520	355	388
W. Mo., Nebr., Kans., Okla., and Ark	249	360	430	431
Texas	338	94	224	178
Colo., Mont., Utah, Wyo., and Idaho	34	39	340	112
California	410	646	1,330	1,260
Oregon and Washington	37	96	255	192
Totals	4,335	3,390	5,995	5,756

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN DECEMBER, 1932 AND 1933 AND STOCKS IN NOVEMBER, 1933 (*In thousands of barrels*)

District	December						Stocks at End of Nov.*a*
	Production		Shipments		Stocks at End of Month		
	1932	1933	1932	1933	1932*a*	1932	1933
Eastern Pa., N. J., and Md	805	383	759	566	3,708	3,605	3,787
New York & Maine	335	56	189	137	1,434	1,672	1,754
Ohio, Western Pa., and W. Va	638	97	308	281	3,084	2,631	2,816
Michigan	153	151	65	148	1,490	1,644	1,641
Wis., Ill., Ind., and Ky	477	518	179	471	2,159	1,867	1,820
Va., Tenn., Ala., Ga., Fla., and La	508	464	377	514	1,572	1,431	1,481
Eastern Mo., Ia., Minn. and S. Dak	422	507	201	291	2,250	2,494	2,278
W. Mo., Nebr., Kans., Okla., and Ark	220	345	164	294	1,766	1,695	1,644
Texas	289	151	165	222	677	557	628
Colo., Mont., Utah, Wyo., and Idaho	0	40	44	84	523	357	400
California	320	699	353	678	990	1,012	991
Oregon and Washington	81	115	31	52	587	533	469
Totals	4,248	3,526	2,835	3,738	20,240	19,498	19,709

a Revised.

Traffic News and Comment

Recent I. C. C. Decisions

Amiesite.—In response to fourth-section application No. 14,460, the Interstate Commerce Commission has granted relief from the long-and-short-haul clause of the fourth section on chats, gravel and sand, coated with not to exceed 10 per cent. of oil, tar or asphalt as authorized in 192 I. C. C. 563.—I. C. C. F. S. O. No. 10,713, Fourth supplemental order.

Plaster-board.—The commission has found the rates on plaster-board from Ft. Dodge, Ia., Southard, Okla., and Sweetwater, Tex., to destinations in western trunk-line territory unreasonable, and has found that reasonable rates will not exceed those made by use of a mileage scale shown in an appendix to the report and has issued an order prescribing these rates, and ordering them made effective not later than Mar. 15. Rates at various points on this scale are:

Miles	Rate	Miles	Rate
10	$0.10	600	$0.31
100	.17	700	.33
200	.22	800	.35
300	.25	900	.37
400	.27	1,000	.39
500	.29	1,500	.49

For hauls in southwestern territory a scale of differentials is prescribed beginning with 1 c. for 150 mi. or less, 2 c. for a distance of from 150 to 500 mi., and 3 c. for distances greater than 500 mi. Distances are to be computed over the shortest route over which car-load freight can move without transfer of lading. Rates from the points mentioned above to destinations in the southwest were found not unreasonable. The minimum weights from these points to destinations in western trunk-line territory were found unreasonable to the extent that they exceeded 40,000 lb. The mixed-car-load rule governing shipments from these points to western trunk-line destinations was found unreasonable and the reasonable rule found to be one that would require using the respective carload rates on the actual weights of each commodity in the car, subject to the highest minimum weight for any of the articles in the car, any deficit in the minimum weight to be charged at the plaster-board rate.

Upon reconsideration of the record on which were made the findings in 157 I. C. C. 586, paragraphs (b), (c) and (d), finding 2 and finding 4 of that report have been modified to provide interstate rates on plaster-board, car-load minimum weight, 40,000 lb., from Ft. Dodge, Southard and Sweetwater to destinations in southwestern territory on the basis of 20 per cent. of the first-class rate, and to western trunk-line destinations by use of the scale as before explained, with the addition of the arbitraries for that portion of the haul from Southard and Sweetwater within southwestern territory, subject to the rates described to intermediate points over routes not more than 5 per cent. circuitous, as *minima*. Rates on fiber wall-board, car-load minimum weight 40,000 lb., from Lockport, N. Y., to the same destinations are to be equal to the present rates. To destinations west of western trunk-line territory and west of southwest territory the rates on fiber-board from Lockport shall not exceed the interstate rates on plaster-board from Southard, Sweetwater and Ft. Dodge, by greater percentages than those which the fifth-class rate from Lockport exceed the contemporaneous Class C rates from Southard, Sweetwater and Ft. Dodge to the same destinations.

While the car-load minimum weight to destinations in western and southwestern territories was prescribed at 40,000 lb., the reasonable minimum to transcontinental destinations was found to be 50,000 lb., on fiber-board and 60,000 lb., on plaster-board. Chairman Farrell and Commissioners Porter and Miller dissented.—I. C. C. Dockets No. 23,823, Gypsum Assn. *et al v.* A. T. & S. F. *et al.*, and No. 17,006, Upson Co. *v.* Ann Arbor *et al.*

Sand.—Reparation amounting to $203.80 has been awarded on finding that the rate charged on molding sand from Shinrock, O., to South Bend, Ind., was unreasonable in the past to the extent that it exceeded $2.20 plus the emergency charge and unduly prejudicial to the extent that it exceeded or may exceed the rates maintained from competing pits in the Sandusky, O., group in which Shinrock is located. New rates are to be established not later than March 15.—I. C. C. Docket No. 25,961, Keener Sand & Clay Co. *v.* N. Y. C. & St. L. *et al.*

Reparation has been awarded on finding that the rate charged on sand, processed for water filtering and softening, shipped in box-cars, from Sewell, N. J., to New York Lighterage, N. Y. (Manhattan Piers, N. J.) for export, is inapplicable on shipments made prior to Aug. 25, 1931. The sixth-class rate was charged prior to that date. On Aug. 24, 1931, a rate of $2.45 became effective and was found not unreasonable. In a dissenting opinion Commissioner Lee said that he was convinced that the commodity rate on sand was not applicable on this finished product selling at prices ranging from 10 to 16 c. a lb. shipped in bags in box-cars.—I. C. C. Docket No. 25,597, Hungerford & Terry, Inc. *v.* Pennsylvania.

Upon reconsideration the commission has modified its findings, reported in 178 I. C. C. 386, covering shipments of molding sand from points in New York to Chattanooga, Tenn., which were found inapplicable. It has now found that, on shipments moving via Maysville, Ky., the rate charged was inapplicable and that a rate of $5.40 was applicable; that the rate of $5.85 charged on shipments moving via Cincinnati, O., was applicable; that on a shipment moving via Cincinnati and delivered to the L. & N. at Louisville, Ky., and on those moving from Elnora, Mechanicsville, Schenectady and Ushers, N. Y., on and after Nov. 25, 1928, the applicable rate was $6.15 but that it was unreasonable to the extent that it exceeded $5.85 and that the complainant is entitled to reparation.—I. C. C. Docket No. 23,416, Crane Enamelware Co. *v.* B. & O. *et al.*

Sand and Gravel.—The commission has found the rate on sand and gravel from Oreapolis, Neb., to Prescott, Ia., not unreasonable. The rate on sand and gravel from Areapolis to Bedford, Ia., has been found not unreasonable in the past, but unreasonable for the future to the extent that it may exceed $1.15 a net ton, and it has ordered the new rate made effective not later than April 21.—I. C. C. Docket No. 25,407, Reed & Wheelock *v.* C. B. & Q., and Sub. 1, Same *v.* Same.

Examiner's Reports

Cement.—Examiner J. G. Cooper proposes that the Commission find the rates on cement from Speed, Ind., to destinations in Arkansas, Louisiana and Missouri, charged on shipments between May 21, 1929, and Sept. 13, 1931, inclusive, unreasonable to the extent that they exceeded corresponding subsequently established rates, and that reparation be awarded on this basis. The present rates reflect western cement scale III prescribed in Western Cement Rates, 52 I. C. C. 225, 69 I. C. C. 644, and 132 I. C. C. 273.—I. C. C. Docket No. 25,953, Louisville Cement Co. *v.* Pennsylvania *et al.*

Lime.—Examiner Alfred G. Hagerty recommends that the commission find the rates on lime, including the emergency charge, from Menominee, Mich., to destinations in Wisconsin, in relation to Wisconsin intrastate rates on which no emergency charge was added, were not unreasonable or otherwise unlawful. The emergency charge was not added to Wisconsin intrastate traffic until after it had become effective on interstate traffic. The examiner said there was insufficient evidence to establish the allegation that the complainants had suffered any damages in consequence of the difference between the interstate and intrastate rates during this period, and recommended that the complaint be dismissed in I. C. C. Docket No. 26,134, Limestone Products Co. *v.* C. & N. W. *et al.*

After further hearing Examiner John J. Crowley proposes that the commission find that the rate charged on lime from Capon Road (Oranda), Va., to McKeesport, Pa., was applicable and that the complaint be dismissed in I. C. C. Docket No. 25,346, Pittsburgh Generator Co. *v.* B. & O. *et al.*

Sand.—Examiner John J. Crowley recommends that the commission award reparation of $7,531.81, with interest at 6 per cent. from Oct. 3, 1932, on finding that the rates charged on molding sand from Millville and Manumuskin, N. J., to Lebanon, Pa., were unreasonable to the extent that they exceeded $1.80, and that the complainants made the shipments and paid the charges.—I. C. C. Docket No. 20,828, Lebanon Steel Foundry *v.* Pennsylvania *et al.*

Terrazzo Material.—Examiner Carl A. Schlager proposes that the commission find the rate charged on one car-load of stone chips or terrazzo material from Springfield, O., to Tulsa, Okla., inapplicable, and that the applicable rate was a joint Class E rate of 41 c. resulting in an undercharge of $3.37, which was not unreasonable. He also recommends that one car-load of the same material from Tulsa to Springfield be found not unreasonable and that the complaint be dismissed in I. C. C. Docket No. 25,787, Tulsa Terrazzo & Mosaic Co. *v.* C. R. I. & P. *et al.*

Rate-Committee Dockets

New England Freight Assn.

Talc.—Shippers propose a reduction in the rate on talc, car-load minimum weight 40,000 lb., from Waterbury, Vt., to Fairfield, Conn.—Docket No. 31,815.

Trunk Line Assn.

Amiesite.—Shippers propose a reduction in the rate on coated crushed stone,[1] from Wertz, Pa., to Punxsutawney, Pa., from $1.35 to $1.23 per ton.—Docket No. 31,817.

Carriers propose a rate on coated crushed stone from White Haven, Pa., to Mill Hall, Pa., of $1.90 per net ton.—Docket No. 31,637, Sup. 1.

Cement.—A reduction in the rate on cement from Binnewater and Rosendale, N. Y., to Haverstraw and West Point, N. Y., from 10 c. to 9½ c. is proposed by carriers.—Docket No. 31,825.

Carriers propose to revise the rates on cement from trunk-line producing points to destinations on the C. & O., Virginian Ry., and the K. G. J. & E., in West Virginia. A statement of the proposed rates will be furnished on request. — Docket No. M-3,290.

Crushed Stone, Sand and Gravel.—Shippers propose the following rates on crushed stone, sand and gravel from Collubbia and Hainesburg, N. J., and Mt. Bethel and Portland, Pa.; to Kutztown, Pa., $1.10; to Blandon and Fleetwood, Pa., $1.20; and to Evansville, Pa., $1.30 per net ton.—Docket No. 31,842.

In Supplement 1 to the above docket carriers propose the same rates from White Haven, Pa.

Feldspar.—Carriers propose a rate on feldspar, car-load minimum weight 60,000 lb., from Waltham, Que., to Rochester, N. Y., of 21 c. per 100 lb.—Docket No. 31,868.

A rate on feldspar, car-load minimum weight 60,000 lb., from Brookneal, Va., to Floreffe, Pa., of $4.68 per net ton is proposed by carriers.—Docket No. 31,919.

Firestone.—Carriers propose rates on fire or ganister stone,[1] to Economy, Pa., from Cumberland, Md., of $3.10 and from Berkeley Springs, W. Va., of $2.30 per net ton.—Docket No. 31,799, Sup. 1.

Ground Limestone.—A reduction in the rate on ground limestone, car-load minimum weight 50,000 lb., from Texas and Cockeyville, Md., to Washington, D. C., from 9½ c. to 6 c. per 100 lb., is proposed by shippers.—Docket No. 31,849.

Gypsum Rock.—Shippers propose a reduction in the rate on gypsum rock from Clarence Centre, Transit, Oakfield, Wheatville and Akron, N. Y., to Weehawken, N. J., for export only, from 25 c. to 12½ c. per 100 lb.—Docket No. 31,934.

Lime.—Carriers propose rates from Carson and Karo, Va., to Steelton, Pa., of 9½ c. on building lime and 9 c. per 100 lb., on agricultural or chemical lime, car-load minimum weight 30,000 lb.—Docket No. 31,888.

Lime and Plaster.—Shippers propose the amendment of all items naming rates on plaster in Curlett's Tariff I. C. C. A-306, except items 5,375-A, 5,405-D, 5,508-A and 7,685, by adding a new note reading: Building lime and/or agricultural lime, and/or plaster and articles taking same rates and/or plaster-board will be charged at actual weight and at the applicable rate for each of the respective commodities, subject to the minimum weight of 40,000 lb., for each mixed car-load, deficit in the minimum weight if any, to be paid at the rate applicable on plaster.—Docket No. 31,828, and Sup. 1.

Roasted Dolomite.—Carriers propose a rate on roasted dolomite, from Blue Bell, Pa., to Cortland, N. Y., of $2.44 per net ton.—Docket No. 31,714.

Sand.—Carriers propose to increase the rates on common and industrial sand from Mt. Eagle and Mapleton districts in Pa., to various destinations on the B. & O., to put these rates on the proper basis. Statement furnished on request.—Docket No. 31,922.

Central Freight Assn.

Cement.—Reductions in the rates on cement, car-load minimum weight 50,000 lb., from Evansville, Ind., to Lincoln City, Ind., to 7½ c., to Rockport, Ind., to 8 c. and to Cannelton, Ind., to 8½ c. per 100 lb., are proposed by carriers.—Docket No. 38,346.

Carriers propose rates on cement to Ferdinand, Ind., of 10 c. from Mitchell, Ind., and 13 c. from Limedale, Ind.—Docket No. 38,351.

Crushed Stone.—Shippers propose a rate on crushed stone and related articles from Centerville, O., to Muncie, Ind., of $1.10 per net ton.—Docket No. 38,399.

Carriers propose a rate on crushed stone from the Bloomington-Bedford, Ind., district to Ottawa, Ill., of $1.90 per net ton.—Docket No. 38,482.

Dolomite.—Shippers at Genoa, Martin, Luckey and Marblehead, O., are asking for the establishment of a rate on raw dolomite to Lancaster, O., of $1.13 per gross ton.—Docket No. 38,486.

Roasted Dolomite.—A reduction in the rate on roasted dolomite from Narlo, O., to St. Louis, Mo., to $2.80 per net ton is requested by shippers.—Docket No. 38,288.

The following rates on roasted dolomite from Martin, O., are proposed by carriers: to Atlanta, Ga., $4.47; Alabama City, Ala., $4.56; Birmingham, Ala., $4.88; and to Woodward, Ala., $4.88 per net ton.—Docket No. 38,490.

Sand.—Carriers propose a rate on refuse sand from Milwaukee, Wis., to Lowell, Ind., of $1.25 per net ton.—Docket No. 38,413.

Sand and Gravel.—Carriers propose to amend the description applying on sand and gravel from Joliet, Ill., to points in Indiana to prohibit application of the rates to industrial sand.—Docket No. 38,241.

Shippers at Painesville, O., are asking that the rates on sand and gravel be reduced to Ashtabula and Cleveland, O., to 60 c.; to Geneva and Saybrook, O., to 50 c.; and to Madison, Mentor, Unionville, Wickliffe and Willoughby, O., to 40 c. per net ton.—Docket No. 38,354.

A line of rates on common sand and gravel in box cars from Toledo, O., to destinations in northern Michigan ranging from $3.10 to $3.75 per net ton, has been proposed by shippers. Statement furnished on request.—Docket No. 38,613.

Western Trunk-Line Committee

Crushed Stone.—Shippers propose a reduction in the rate on crushed stone[1] from Dubuque, Ia., to Cassville, Wis., from $1.00 to 80 c. per net ton.—Docket No. 8,719.

Gravel.—A rate on gravel[1] of $1.06 per net ton to apply from Pacific, Jedburg, and Valley Park, Mo., to Alton, Ill., is proposed by shippers.—Docket No. 7,283-3.

Lime.—It is proposed to reduce the rate on lime as described in St. L-S. F. Tariff 69-L, car-load minimum weight 30,000 lb., from Group 1, (Sequiota, Mo., etc.), to C. R. I. & P. stations, Valley Jct., Ia., to Council Bluffs, Ia., and Omaha, Nebr., from 17½ c. to 16 c. per 100 lb.—Docket No. 5,071-F.

Plaster.—Shippers propose a revision of the rates on plaster and related articles, car-load minimum weight 40,000 lb., from (A) Blue Rapids and Irving and from (B) Medicine Lodge, Kans., to C. F. A., T. L. A. and No. E. F. A. territories based on I. C. C. 12,704 Scale, Plus 25 per cent., with a maximum plussage of 5 c. Examples of present and proposed rates in Docket No. 6,611-C, are:

To	Present (A)	Present (B)	Proposed (A)	Proposed (B)
Cincinnati, O.	30 c.	30 c.	29 c.	31 c.
Cleveland, O.	35½ c.	35½ c.	31 c.	33½ c.
Columbus, O.	38½ c.	38½ c.	30 c.	32½ c.

Sand and Gravel.—It is proposed to establish on sand and gravel[1] from Anson, Wis., rates of $3.28 per net ton to Saginaw, Mich., and $3.49 per ton to Detroit, Mich.—Docket No. 8,232-2.

Southern Freight Assn.

Cement.—It is proposed to establish the following rates on cement, car-load minimum weight 50,000 lb., for export from Graystone, Ala., to Pensacola, Fla., and Mobile, Ala., 16½ c.; Gulfport, Miss., 18 c.; New Orleans, La., 19 c. per 100 lb.—Docket No. 3,716.

Ground Limestone.—Carriers have suggested the establishment of a rate on ground limestone, car-load minimum weight 60,000 lb., from Dugan, Ky., to E. St. Louis, Ill., and St. Louis, Mo., of $2.20 per net ton.—Docket No. 3,850.

Carriers propose a rate on ground limestone or marble, from Cartersville, Ga., to Johnson City, Syracuse and Rochester, N. Y., of $6.43 per net ton.—Docket No. 3,972.

Southwestern Freight Bureau

Cement.—Shippers propose the establishment of rates of 19½ c. to Dewey, Okla., and 23½ c. per 100 lb. to Ada, Okla., from E. St. Louis, Ill., and St. Louis, Mo., applicable only on traffic originating at points east of the Illinois-Indiana state line, on cement, car-load minimum weight 50,000 lb.—Docket No. 2,593.

Finishing Plaster.—It is proposed to apply Class 15 rating on the following described commodity, car-load minimum weight 40,000 lb., and Class 12 on a car-load minimum weight of 60,000 lb. Description: Cement finishing or interior finish-coat plaster, commonly known as colored plaster, consisting of a mixture of two or more of the following commodities: Plaster or lime, or portland cement or gypsum, or keene's cement, and not less than 50 per cent. of sand or chats and not to 3 per cent of dry color.—Docket No. A-1,259.

Lime.—Shippers are asking for a reduction in the rate on lime from New Braunfels, Dittlinger, Austin, McNeil, Round Rock, Houston, and other Texas producing points to New Orleans, La., and points within that switching district, from 20½ c. to 16½ c. per 100 lb.—Docket No. 2,567.

Carriers propose a rate on lime, car-load minimum weight 30,000 lb., from Keystone, Ala., to Beaumont, Tex., of $5.60 per net ton.—Docket No. 2,622.

Shippers at Texas producing points in the second item above are asking for a reduction in the rate on lime to Portland, Colo., to 35½ c. per 100 lb.—Docket No. 2,649.

Sand.—Carriers propose a rate on silica sand[1] from Everton, Ark., to Jackson, Miss., of $2.70 per net ton.—Docket No. 2,721.

Texas-Louisiana Tariff Bureau

Cement.—The following scale is to be considered as a substitute for the scale under which rates subject to Item 200-B, Sup. 35, to Texas Lines' Tariff No. 58-A, were established for distances of less than 75 miles.—Docket No. 8,850-TX.

Miles	Rate	Miles	Rate
20	$0.04	50	$0.09
25	.045	55	.10
30	.05	60	.10
35	.06	65	.105
40	.07	70	.105
45	.08	75	.105

[1] The car-load minimum weight will be 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply.

National Gypsum Co. to Buy Metal Lathe Plant

The National Gypsum Co., Buffalo, N. Y., is reported to have completed negotiations for the purchase of the metal lathe plant of the Kalman Steel Corp. at Niles, O. According to M. H. Baker, president, this plant will be converted for the manufacture of steel lathe and reinforcing items as a step in the company's policy of expansion in the wall and ceiling building products field.

Marquette Cement Co. Raises Wages 20 Per Cent.

The Marquette Cement Mfg. Co., Chicago, Ill., recently announced a 20 per cent. increase in pay, the second raise in the last 6 months, which will affect almost 1,000 employes of the company at its plants at Cape Girardeau, Mo., and Oglesby, Ill. The new wage schedule is said to be 45 per cent. above the minimum set by the N. R. A.

California University Completes Cement Tests

After 3 years of research, the University of Cal., Berkeley, Cal., has completed its tests on cements for Boulder Dam, a preliminary report of which was made in March, 1933, to determine the cement to be used in the dam. Tests since that time were devoted to the action of the cement over long periods of time.

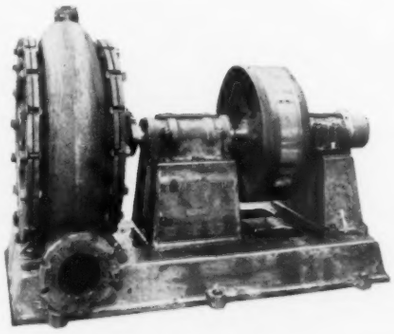
The Chester County court has granted permission to Fred S. Wood and E. R. Scott, receivers of the Chester Valley Lime & Products Co., West Chester, Pa., to sell the plant and equipment at private sale.

The Mississippi River Sand & Gravel Co., has moved its headquarters from Rosedale to Vicksburg, Miss. At its new location the company will work in cooperation with the Dutton Sand & Gravel Co.

New Machinery and Supplies

"Wear Resister" Construction Feature of New Dredging Pump

The general features, relative to design, of a dredge pump, which forms the most important unit of a hydraulic sand and gravel plant, are well known to sand and gravel producers, but the "Wear Resister" incorporated in the new "Diamond" pump is, according to its manufacturer, the Pettibone Mulliken Co., Chicago, Ill., as yet not generally known. In a dredge pump,



Diamond dredge pump.

when the joints between the shell and the sideplate castings are not sufficiently tight to prevent entry of water carrying sand and other abrasive materials, which remain in these joints setting up an abrading or wearing action on these parts, this undesirable abrading or wearing action causes such impairment to these parts as to render the dredge pump inoperative. The "Wear Resister" is said to totally eliminate this wear at these vital joints, resulting in longer life to the pump, greater sand and gravel production, less shutdown periods, and consequently, a lower cost of production.

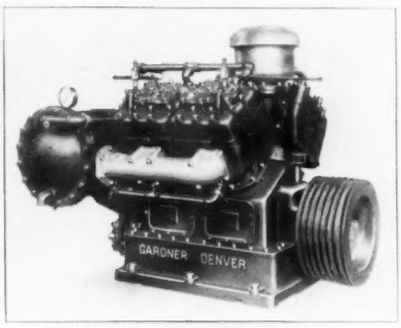
The construction of the "Diamond" dredge pump equipped with the "Wear Resister" is such that a rubber ring is compressed into the opening between the shell and the sideplates by inwardly tapering surfaces. The greater distance the side plate is moved inward toward the impeller, the more the rubber is compressed. This is said to be particularly desirable since the "Diamond" pump is designed so that the suction side plate can be moved inward toward the impeller to take up wear on the suction side plate and impeller to prevent internal leakage.

"Diamond" dredge pumps in all sizes have been manufactured by Pettibone Mulliken Co. for many years, in belt driven and direct connected units. "Diamond" dredge pumps equipped with the "Wear Resister" have been in service for approximately three years. The wearing parts most generally are made of the well known "Diamond" manganese steel.

Various sizes of Diamond pump housings.

Cushioned Discharge Valves Used in Vertical Compressor

The Gardner-Denver Co., Quincy, Ill., announces a new line of vertical air compressors. Among the advantages claimed for these units over previous models are lower maintenance costs, lower installation costs and savings in floor space. Inlet and discharge valves are cushioned, extra large water jackets completely surround the cylinders and valves, and a



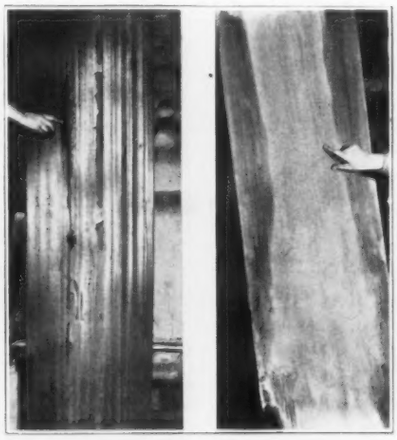
Gardner-Denver air compressor.

water-cooled intercooler is said to save power and increase volumetric efficiency by cooling air between stages.

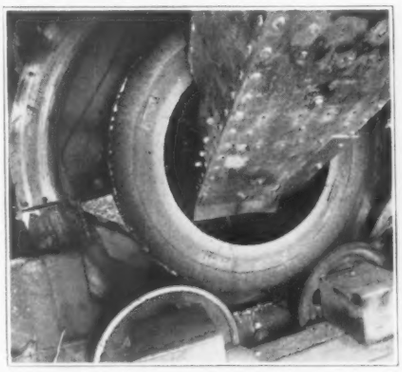
The crankshafts are large diameter forged steel supported by three bronze-backed, babbitt-lined, full-circle main bearings. All bearings are pressure lubricated through drilled passages and a rotary oil pump assures constant and uniform oil pressure.

Plastic-Rubber Compound for Belts and Chute Lining

The Self-Vulcanizing Rubber Co., Inc., Chicago, Ill., manufactures "Selfvulc," a self-curing plastic rubber compound for use in the repair and maintenance of



Belt before and after Selfvulc treatment.



Chute lined with Selfvulc.

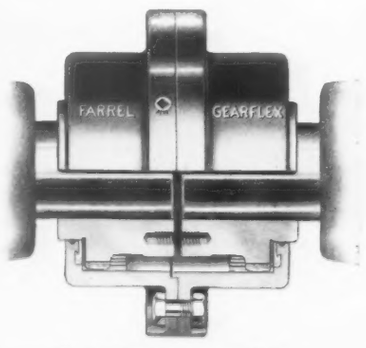
equipment that is exposed to extreme wear or corrosion. No heat or pressure is required in its application and it is claimed to vulcanize permanently to steel, wood, cement, brick, rubber, canvas, etc. A rubber solution "F" is supplied for a bond when Selfvulc is to be applied to rubber and canvas and "M" primer for other materials. Selfvulc is supplied in paste form and may be applied by anyone.

One of the most important uses for Selfvulc is the resurfacing of worn conveyor belting, which it is said can be done successfully even when the original rubber cover is completely gone. Timely application to slightly worn spots on a belt will also stop the rapid deterioration which always follows. Applied to protect conveyor joints where metal fasteners are used it prevents water and small particles from reaching the idlers, lessening the danger of freezeups and the abrasive wear to the underside of the belt. Damage to the belt at the joints is also prevented.

Selfvulc is also said to make a satisfactory lining for any equipment subject to severe abrasion such as chutes and to last many times longer than boiler plate or manganese steel. It also can be used for coating pipes, unions, valves, etc. Other uses for which the manufacturer recommends this material are for lining ore cars, screen peaks, end and baffle plates, impellors, classifiers, agitators, centrifugal pumps, and flooring, and for cable, hose, tube and pipe covering.

Flexible Coupling in Single- and Double-Engagement Types

The Farrel-Birmingham Co., Inc., Buffalo, N. Y., recently introduced a new flexible coupling of the gear type known as the "Gearflex" coupling. The double-engagement type illustrated consists essentially of two externally-geared hubs keyed



Farrel-Birmingham coupling.

to the two shafts to be connected and engaging an internally-geared floating sleeve which encases the two hubs. As the sleeve has a set of spur gears at each end misalignment is compensated for by the sleeve assuming a neutral position between the two shafts. A large reservoir between the hubs and the sleeve carries the lubricating oil which is spread by centrifugal force.

The Gearflex coupling is also made in a single-engagement type which has only one externally-geared hub in engagement with an internal gear in the sleeve, the other hub being solid and the sleeve bolted to it. This lower cost unit is designed for use where the high-speed capacity and flexibility of the double-engagement type is not required.

Dragline Bucket of Greater Working Range and Output

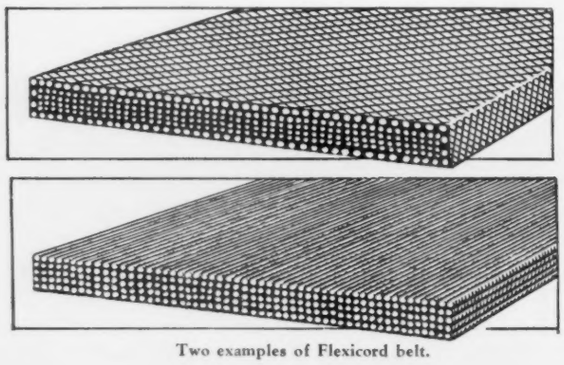
The Northwest Engineering Co., Chicago, Ill., manufacturers of shovels, cranes and draglines, announce a new dragline bucket as part of their line. This bucket is designed to increase working ranges and output in earth excavation and is of light-

Northwest dragline bucket.

weight construction with a wide mouth. It embodies the heat-treated arch which is made of a heavy I-beam section and the lip is of rolled alloy steel, also heat treated. This bucket is built in 3 sizes, 54, 67½ and 81 cu. ft. capacities, struck measure.

Automobile-Tire Cords Form Basis of Transmission Belts

The Cincinnati Rubber Mfg. Co., Cincinnati, O., recently improved on the construction of its Flexicord Endless-transmission belt. This belt, claimed by its manufacturers to be the first truly endless belt, has no extra thickness at any point. The basis of these belts are auto tire cords which are said to prevent stretching and overcome bootlegging. The envelope which encases this load-carrying center is laid on the bias to give added flexibility. Slippage is said to be practically eliminated.



Two examples of Flexicord belt.

No Dog Holes Needed With Improved Type of Rock Grab

The Bucyrus-Erie Co., South Milwaukee, Wis., announces a new rock grab which is said to be specially adapted to handle rock or cut stone of practically any size or dimensions. With this grab the rock may be tipped or rolled and may be picked up

Bucyrus-Erie rock grab.

even when surrounded by other pieces. It is laid down exactly in place without resetting, shifting or jacking. No dog holes are necessary and rubber pads can be supplied to permit the handling of polished stone without marring. Releasing the closing line immediately frees the lifted object. This grab is at present made in four sizes of 2½, 5, 10 and 20-ton capacity.

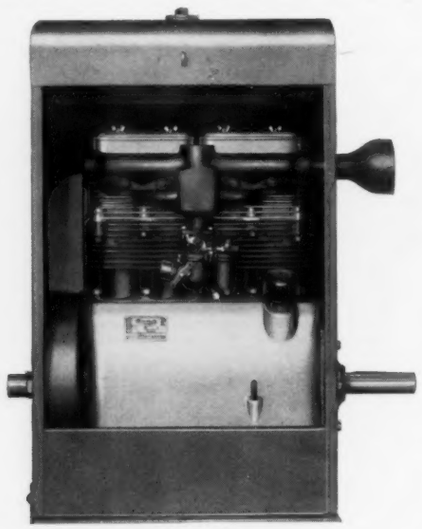
Coupling Starts, Couples, Cushions and Limits Load

The Falk Corp., Milwaukee, Wis., announces the new 4-Duty Falk-Rawson flexible coupling which starts, couples, cushions and limits the load. The primary function of this coupling is that of an automatic starter, centrifugally operated. The construction involves two drum-shaped members, one attached to the driving member and one to the driven member. Between these members are inserted two sets of floating segments, made usually of brake lining reinforced with lead in the right quantities to give the required centrifugal pressure for carrying the load. This coupling is said to eliminate the necessity for the use of oversize, high-torque, or wound-rotor motors in many cases.

It is said that this coupling also fulfills the two important functions of a flexible coupling by providing for moderate shaft misalignment, both parallel and angular, and allows the necessary end float between the two members. In absorbing torsional shock in the drive the shoes act as a slipping clutch connection, taking up the shock by their slippage until the overload is relieved. This unit is made in Types A for direct connection, and B for overhung drives. Spring control can be incorporated to keep the machine from being driven until a predetermined speed of the prime mover is reached. A retractive design combines automatic starting and manual release and another application is as a protective or braking device.

New Engine Reaches Peak of Power at 2,600 R. P. M.

The Wisconsin Motor Corp., Milwaukee, Wis., has brought out a new heavy-duty 4-cyl. air-cooled gasoline engine of 6 to 16 hp. This engine is known as Model "AC4" and has a 2⅝-in. bore and 3¼-in. stroke



Wisconsin air-cooled gasoline engine.

with a piston displacement of 70.35 cu. in. The peak horsepower is reached at 2600 r.p.m. A feature of this engine is its light weight which was secured by employing light weight materials of high tensile strength in its construction. The engine with accessories is said to weigh only 215 lb. and complete with house, gas tank, etc., only 265 lb. The overall length of the complete unit is 20¼ in.

Concrete Waterproofing Is Produced in Three Grades

The Master Builders Co., Cleveland, O., manufactures three new materials for waterproofing concrete. Stearox "30" is a waterproofing compound for mass concrete or mortar which is said to be free from harmful adulterants. By the use of an improved process a compound containing 30 per cent. of stearic acid has been developed without losing the soft paste consistency desired. It is claimed that only 6/10 lb. of Stearox "30" need be used per sack of cement to obtain maximum waterproofing efficiency.

The new Omicron 4-in-1 waterproofing is a thick, viscous liquid, greenish-brown in color but having no effect on the color of the concrete. It is claimed that this material waterproofs, plasticizes, strengthens, and checks corrosion in the concrete. It is designed for use in all kinds of mass concrete, slabs, floors, cast stone, plasters, stuccos, mortars, etc.

The Masterseal all-weather colorless surface waterproofing is a product which can be applied to either wet or dry surfaces. It is said that it can be safely applied at any temperatures down to freezing, the only requirement being that the surface be clean. Only one coat is required except on extremely porous surfaces.

Falk-Rawson flexible coupling.

Manufacturers' Publications

Wiley Whirley. 20p. (Booklet, Clyde Iron Works, Duluth, Minn.) Describes and illustrates the Wiley Whirley and its application to clamshell, dragline and hoisting work. Specifications given for six sizes made.

General Purpose Hoists. (Bull. RH-1, Harnischfeger Corp., Milwaukee, Wis.) Illustrates and describes application of hoists for both general and specific problems. Also lists specifications and ratings of Type R hoists electrical accesories.

Transit Mixers. (Transit Mixers, Inc., Oakland, Cal.) Manufactured by the Ransome Concrete Machinery Co., Dunnellen, N. J. Circular depicts the Transit mixer in use for various types of concrete work.

Goodrich Vulcalock Valve. 4 p. (B. F. Goodrich Rubber Co., Akron, O.) Insert describing a rubber-lined valve for handling corrosive and abrasive fluids under conditions of fairly high pressure, pulsating pressure, throttling or suction.

The Cedar Rapids Line. 4 p. (Iowa Manufacturing Co., Cedar Rapids, Ia.) Circular mentions and illustrates the various types of equipment made by this company including crushers, field conveyors, portable and permanent crushing, washing and screening plants, driers, asphalt plants, etc.

Bristol Co. Incorporates New Canadian Subsidiary

The Bristol, Co., Waterbury, Conn., announces that in order to serve the Canadian market still better and to expand and consolidate its present Canadian service laboratory of 12 years standing so as to include sales, service and manufacturing, a separate company, The Bristol Co. of Canada, Ltd., has been incorporated. Factory and general headquarters will be located at 64 Princess St., Toronto, Ont., where Bristol recording, indicating and control instruments will be made. J. S. Mayberry, graduate engineer of Toronto University, and for 10 years with the parent company, has been appointed manager.

Notice has been given that the name of the Hess-Bright Mfg. Co., has been discontinued and that all future trading will be done in the name of SKF Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.

Cement Code *(from page 22)*

gan, president of the Lone Star Cement Co., and representing the Cement Institute, said that in a general sense the code followed a method of marketing practice of long standing. He said that for many years dealers had been given an established differential of 10 c. a bbl. on cement, but that the dealers would not maintain the price and by charging less had added to the demoralization of the industry until today all cement manufacturers are "in the red."

Lester R. Stewart, representing the Westchester County Building Supply Dealers' Assn., said that the yards of its members could not continue to operate if there was any material reduction in the volumes of sales. He declared that his dealers "can not and will not submit to this code."

Walter N. Haggerman, president of the Builders' Supply Assn. of Philadelphia, said that members of the industry had always been heartily in accord with the N. R. A. but that the operation of the cement code had caused them to lose the first blush of enthusiasm. It was a case, he said, "of when the wolf comes to the door, love and the Blue Eagle fly out of the window."

Additional witnesses who voiced their protests against operation of the code as written included George S. Cook, president of the New England Builders' Supply Assn.; B. E. Reid, of the Building Institute of Cleveland; E. R. Newland, of the Indiana Builders' Supply Dealers' Assn.; and W. G. Bradshaw, representing the Building Material Dealers' Assn. of Providence, R. I.

MANY OUTSTANDING FEATURES IN THE NEW

•PANGBORN•
"CH" DUST COLLECTOR

5 MOST IMPORTANT IMPROVEMENTS PROVIDE . . .

1. All Steel Construction.
2. Non-Collapsible Wire Mesh Frames, Quickly and Easily Removable Without Disturbing Adjacent Frames, Rapping Mechanism, or Steel Casing.
3. All Moving Parts on Clear Air Side, Free From Wear and Dust.
4. Maximum Obtainable Cloth Area For Space Available.
5. Unit Construction Permits Flexibility of Arrangement.

Write for detailed drawings and data.

PANGBORN CORPORATION
HAGERSTOWN . . . . . MARYLAND

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

Index to Advertisers on Page 72

Abrasives
*Pangborn Corp.

Aggregate Bituminizing Plants
American Sealdrok Corp.

Agitating Ladders (Dredge)
*Eagle Iron Works
Pettibone-Mulliken Co.

Air-Conditioning Equipment
*Pangborn Corp.

Air Compressors (Portable)
Amplex Mfg. Co.

Air Separators
*Gruendler Crusher & Pulv. Co.
*Pangborn Corp.

Alloys, Steel
Chicago Steel Foundry Co.

Ash and Refuse-Handling Equipment
Allen-Sherman-Hoff Co.
*Bartlett & Snow Co., C. O.
*Hetherington & Berner, Inc.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Automatic Feeders
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.

Automatic Weighers
*Bartlett & Snow Co., C. O.

Balls (Grinding)
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Balls (Tube-Mill, etc.)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Jeffery Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Bearings (Anti-Friction)
*Bartlett & Snow Co., C. O.
*Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Belting
Goodyear Tire & Rubber Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Self-Vulcanizing Rubber Co.
*Sprout, Waldron & Co.
Thermoid Rubber Co.

Belting (Multiple V)
Goodyear Tire & Rubber Co.
Thermoid Rubber Co.

Bin Gates
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Bins (Cast Iron)
Allen-Sherman-Hoff Co.

Bins (Steel)
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
*Hetherington & Berner, Inc.
Iowa Mfg. Co.
Jeffery Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
Atlas Powder Co.

Blasting Supplies
Atlas Powder Co.
*Ensign-Bickford Co.

Blocks (Sheave)
*Sauerman Bros., Inc.
*Sprout, Waldron & Co.

Blowers
*Pangborn Corp.

Bodies (Motor Truck, Concrete Mixing)
*Bartlett & Snow Co., C. O.

Borings, Core
Mott Core Drilling Co.
Pennsylvania Drilling Co.
Sprague and Henwood, Inc.

Brake Linings
Thermoid Rubber Co.

Bucket Elevators (See Conveyors and Elevators)

Buckets (Clamshell, Orange-Peel, Etc.)
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Pettibone-Mulliken Co.
Wellman Engr. Co.

Buckets (Dragline—Cableway)
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
*Sauerman Bros., Inc.
Wellman Engr. Co.

Buckets (Elevator and Conveyor)
*Bartlett & Snow Co., C. O.
Chicago Steel Foundry Co.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone-Mulliken Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Bulk-Cement Storage Plants
*Sprout, Waldron & Co.

Cableways
*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
*Link-Belt Co.
*Sauerman Bros., Inc.

Caps (Blasting)
Atlas Powder Co.

Capstans (See Winches and Capstans)

Car Dumpers
*Link-Belt Co.
Wellman Engr. Co.

Car Pullers
*Bartlett & Snow Co., C. O.
Jeffery Mfg. Co.
*Link-Belt Co.

Carriers
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Car Wheels — (See Wheels — Car)

Castings
*Bartlett & Snow Co., C. O.
Chicago Steel Foundry Co.
*Eagle Iron Works
*Hetherington & Berner, Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone-Mulliken Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete-Mixing Plants (Complete)
*Bartlett & Snow Co., C. O.
*Sprout, Waldron & Co.

Chain (Dredge and Steam Shovel)
Manganese Steel Forge Co.

Chain Drives
*Link-Belt Co.

Chain (Elevating and Conveying)
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Chutes and Chute Liners
*Bartlett & Snow Co., C. O.
Goodyear Tire & Rubber Co.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Classifiers
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
*Pangborn Corp.

Clips (Wire Rope)
*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.

Clutches
Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

Cones (Sand-Washing)
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Conveyor Belting (See Belting)

Conveyors Idlers and Rolls
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Conveyors and Elevators
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Barber-Greene Co.
Chicago Steel Foundry Co.
*Gruendler Crusher & Pulv. Co.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Universal Crusher Co.

Conveyors (Ready-Mixed Concrete)
*Bartlett & Snow. Co., C. O.
Jeffrey Mfg. Co.
*Robins Conveying Belt Co.

Coolers (See Kilns and Coolers —Rotary)

Couplings (Flexible and Shaft)
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Couplings (Hose, Pipe, etc.)
Thermoid Rubber Co.

Cranes (Crawler and Locomotive)
*Link-Belt Co.
Northwest Engr. Co.
Ohio Power Shovel Co.

Crusher Parts
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Pettibone-Mulliken Co.

Crushers (Hammer)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Dixie Machy. Mfg. Co.
*Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Universal Crusher Co.

Crushers (Jaw and Gyratory)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
Smith Engr. Works
Universal Crusher Co.

Crushers (Ring)
*Bartlett & Snow Co., C. O.

Crushers (Roll)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.

Crushers (Rotary)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.

Crushing Rolls
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.

Detonators
Atlas Powder Co.

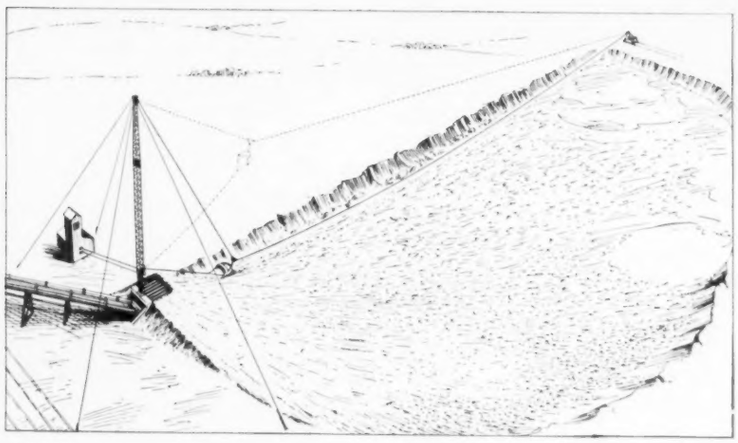
Diesel Engines (See Engines—Diesel)

Dipper Teeth
Pettibone-Mulliken Co.

Dragline Cableway Excavators
*Link-Belt Co.
*Sauerman Bros., Inc.

*** See also information in the 1933 Pit and Quarry HANDBOOK.**

Low Cost Digger and Conveyor SAUERMAN



Digs and Hauls 200 to 500 cu. yd. Hourly at Cost of a Few Cents per Yard . . .

SLACKLINE SCRAPER

After several lean years there is an opportunity this season for the owners of large sand and gravel plants to make real profits.

However, the mere possession of a large plant will not insure maximum profits. There is more need than ever to use the most economical equipment. This is where the Sauerman Slackline Scraper fits into the picture.

The Sauerman Slackline Scraper is able to span a large deposit and move thousands of cubic yards per day from pit to plant at a minimum cost per yard. It operates under water as well as in dry ground. It is a simple machine, yet it has the power and the capacity to cope with the heaviest excavating work.

Write today for complete details. Tell us about your problem.

SAUERMAN BROS., Inc., *Manufacturers of Drag Scrapers, Slackline Scrapers, Slackline Cableways, Tautline Cableways,* 434 S. Clinton St., Chicago

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Spiral Screw and Log Washers, De-Waterers and Shale Removers, Flume Classifiers, Swintek Ladder Suction Screen Nozzles, Chain Type Cutters, Barges and Pontoons, A Frame and Gantry Hardware, Vibrating and Revolving Screens, Steel Dump Cars, Grizzlies, Car Wheels and Trucks, Steel Bins, Water Tanks, Structural Towers, and Dry Pans.

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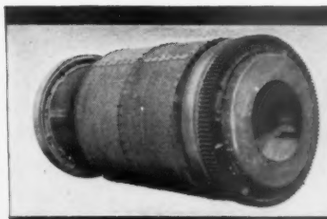

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CONVEYORS

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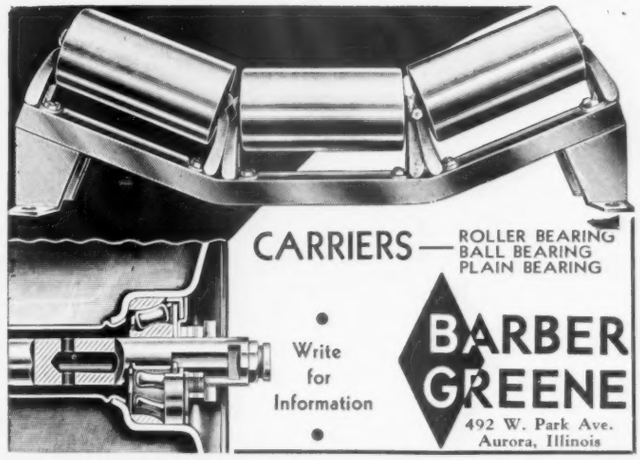

CARRIERS — ROLLER BEARING
BALL BEARING
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Write for Information

BARBER GREENE
492 W. Park Ave.
Aurora, Illinois

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 72

Dragline Excavators
*Link-Belt Co.
Northwest Engr. Co.
Ohio Power Shovel Co.
*Sauerman Bros., Inc.

Dredges
*Hetherington & Berner, Inc.
*Morris Machine Works

Drilling Contractors
Mott Core Drilling Co.
Pennsylvania Drilling Co.
Sprague and Henwood Inc.

Drills, Diamond
Mott Core Drilling Co.
Pennsylvania Drilling Co.
Sprague and Henwood Inc.

Drills (Rock)
Jeffrey Mfg. Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.

Dust Arresters
*Pangborn Corp.

Dust-Collecting Systems
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Pangborn Corp.

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Dynamite (See Explosives)

Electrical Equipment
*Allis-Chalmers Mfg. Co.

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Engineers
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
*Pangborn Corp.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.
Wellman Engr. Co.

Engines (Diesel)
Climax Engr. Co.

Engines (Internal-Combustion)
Amplex Mfg. Co.
Climax Engr. Co.

Engines (Steam)
*Morris Machine Works

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Explosives
Atlas Powder Co.

Fans (Exhaust)
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Morrow Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.

Gaskets
Goodyear Tire & Rubber Co.
Thermoid Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gas Producers
Wellman Engr. Co.

Gates (Bin) (See Bin Gates)

Gears (Herringbone)
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
Pettibone-Mulliken Co.
*Sprout, Waldron & Co.

Gears and Pinions
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grating (Steel)
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.

Grinding Balls (See Balls, Grinding)

Grizzlies
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Manganese Steel Forge Co.
Pettibone-Mulliken Co.
*Robins Conveying Belt Co.
Smith Engr. Works

Guards (Wire)
*Bartlett & Snow Co., C. O.

Guns (Hydraulic)
Georgia Iron Works
*Hetherington & Berner, Inc.

Hammer Mills (See Crushers—Hammer)

Hoists
*Bartlett & Snow Co., C. O.
*Hetherington & Berner, Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Sauerman Bros., Inc.
Smith Engr. Works
*Sprout, Waldron & Co.

Hoppers
*Hendrick Mfg. Co.

Hose (Air, Steam and Water)
Goodyear Tire & Rubber Co.
Self-Vulcanizing Rubber Co.
Thermoid Rubber Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

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*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Lifter Plates
Chicago Steel Foundry Co.

Lime-Handling Equipment
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Lime Kilns
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Liquid Rubber
Self-Vulcanizing Rubber Co.

Loaders and Unloaders
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Locomotives (Electric, Gas and Steam)
*Lima Locomotive Works

Locomotives (Trolley-Battery)
Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
Manganese Steel Forge Co.
Pettibone-Mulliken Co.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co.
Pettibone-Mulliken Co.

Mill Liners and Linings
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mch. Co.
*Sprout, Waldron & Co.

Motor Trucks
General Motors Truck Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.

Nozzles (Gravel Washing)
Binks Mfg. Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
Binks Mfg. Co.

Packings
Goodyear Tire and Rubber Co.
Self-Vulcanizing Rubber Co.

Perforated Metal Plates
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*Bartlett & Snow Co., C. O.
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*Hendrick Mfg. Co.
Morrow Mfg. Co.
*Sprout, Waldron & Co.

Pipe Flanges
Georgia Iron Works
*Hetherington & Berner, Inc.

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Self-Vulcanizing Rubber Co.

Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Barber-Greene Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Portable Crushing and Screening Plants
Austin-Western Road Mchy. Co.
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
Universal Crusher Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
*Sprout, Waldron & Co.

Pulleys (Wing)
*Sprout, Waldron & Co.

Pulverized Fuel Systems
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Pulverizers (See also Crushers; Mills; etc.)
*Bartlett & Snow Co., C. O.
Gay, Rubert M.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
Universal Crusher Co.

Pump Valves (See Valves Pump)

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.
*Morris Machine Works

Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
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*Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone-Mulliken Co.

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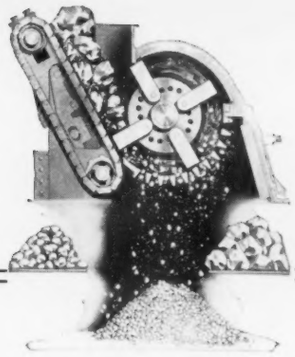
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Georgia Iron Works
*Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone-Mulliken Co.

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Georgia Iron Works
*Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone-Mulliken Co.

*** See also information in the 1933 Pit and Quarry HANDBOOK.**



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That is why you can depend upon the DIXIE MOGUL Non-Clog Hammermill for extra large output and uninterrupted operation—no delays, no losses, no breakdowns.

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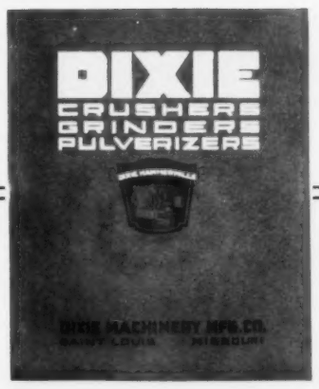

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104″ long (over all) . . . 70″ wide . . . Weight —2740 lbs. . . . Operating pressure—100 lbs. . . . Displacement—136 cu. ft. per min. . . . Electric starting . . . Full pressure feed lubrication . . . Convenient instrument board . . . Automatic pressure control, regulating engine speed to demand for air . . . Mechanically controlled valves for high volumetric efficiency . . . Separate cooling systems for motor and compressor . . . Air intake silencer . . . Pneumatic tires . . . Interchangeability of parts.

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AMPLEX DIVISION

DETROIT, MICH.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 72

Ready-Mixed Concrete Plants
*Bartlett & Snow Co., C. O.

Rock Drills (See Drills—Rock)

Rod Mills
*Kennedy-Van Saun Mfg. and Eng. Corp.

Rope (Wire) (See Wire Rope)

Rust Protection
Self-Vulcanizing Rubber Co.

Safety Appliances
*Pangborn Corp.

Sand-Blast Equipment
*Pangborn Corp.

Sand Separators
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works

Sand-Settling Tanks
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Scrapers (Power Drag)
Iowa Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Screens
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Deister Concentrator Co.
Deister Machine Co.
*Eagle Iron Works
*Gruendler Crusher & Pulv. Co.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Universal Crusher Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
*Deister Concentrator Co.
Deister Machine Co.
*Gruendler Crusher & Pulv. Co.
Iowa Mfg. Co.
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*Kennedy-Van Saun Mfg. and Eng. Corp.
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McLanahan and Stone Corp.
Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Universal Crusher Co.

Separators (Air) (See Air Separators)

Sheaves
*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
*Gruendler Crusher & Pulv. Co.
*Hetherington & Berner, Inc.
Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone-Mulliken Co.
*Sprout, Waldron & Co.

Shovels (Electric, Internal Combustion and Steam)
*Link-Belt Co.
Northwest Engr. Co.
Ohio Power Shovel Co.

Skip Hoists and Skips
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*Bartlett & Snow Co., C. O.
*Hetherington & Berner, Inc.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Speed Reduction Units
Iowa Mfg. Co.
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Sprays
Binks Mfg. Co.

Sprays (Paint)
Binks Mfg. Co.

Sprockets and Chain
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
Pettibone-Mulliken Co.
*Sprout, Waldron & Co.

Stackers
Jeffrey Mfg. Co.

Steel (Alloy)
Chicago Steel Foundry Co.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
*Hendrick Mfg. Co.
*Hetherington & Berner, Inc.
*Sprout, Waldron & Co.

Storage Equipment
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Sweeping Systems
Allen-Sherman-Hoff Co.

Tanks
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.

Tanks (Sand-Settling)
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.
Smith Engr. Works

Tools (Drill) (See Drilling Accessories)

Track Equipment
Pettibone-Mulliken Co.

Tractors
*Allis-Chalmers Mfg. Co.

Trailers
General Motors Truck Co.

Tramways (Aerial)
*American Steel & Wire Co.

Transformers
*Allis-Chalmers Mfg. Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
*Link-Belt Co.

Trippers
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
*Bartlett & Snow Co., C. O.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Underground Loaders
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.

Unloaders (Box Car)
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.

Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Morrow Mfg. Co.

Vibrating Screens (See Screens—Vibrating)

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works

Welding Supplies
*American Steel & Wire Co.
Manganese Steel Forge Co.

Well Drills (See Drills—Well)

Wheels (Car)
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Iowa Mfg. Co.
Pettibone-Mulliken Co.

Winches and Capstans
*Bartlett & Snow Co., C. O.
Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

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Manganese Steel Forge Co.
*Robins Conveying Belt Co.

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*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
Williamsport Wire Rope Co.

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*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
Williamsport Wire Rope Co.

Wire Rope Slings
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*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
Williamsport Wire Rope Co.

Wire (Welding)
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Worm Gears (See Gears and Pinions)

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One large company operating nineteen plants—all Leahy equipped—says the following regarding the Leahy Screen: "We have standardized on this screen because we have been able to rely upon it for economical, dependable, and satisfactory service."

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New York Office: 104 Pearl St., New York

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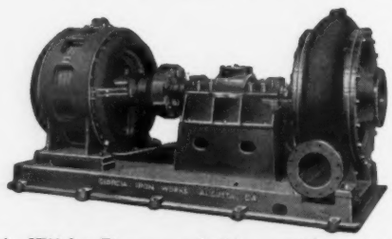

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The machine is designed to accomplish both primary crushing and secondary or final reduction, all in a single operation. This fact, coupled with its phenomenally high capacity and low weight, and its universal adjustability to the size of the material to be crushed, also its adjustability to the refractory nature of the material, make it particularly suitable for use in portable plants, which are finding such great favor among operators of permanent plants and political subdivisions.

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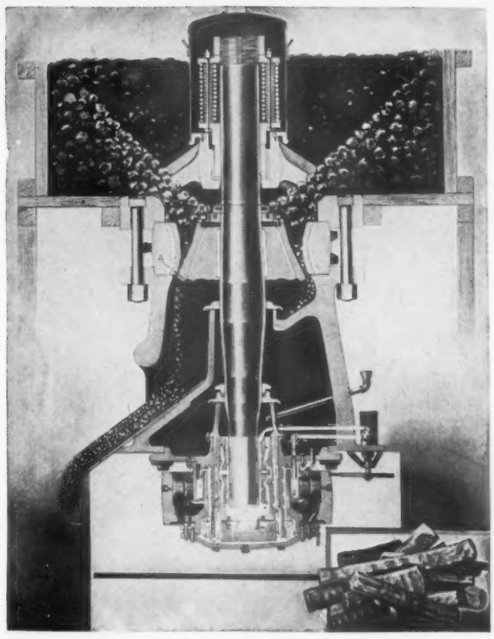
PIT *and* QUARRY Publications

538 S. Clark St., Chicago



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Guaranteed!

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The Savings Effected with this crusher are astounding:

In cost of Maintenance.....80%
In Power.....The entire cost of crusher and motor in pulley is amortized annually.

Sieving test on glacial gravel crushed at the rate of 18 tons per hour, with No. 19 crusher set to 1/8 in., and using less than 15 hp., follows:

Minus 3/8 in.	100%
Plus 3 mesh	21½%
Minus 3—Plus 4	17%
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15%
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Minus 100	5½%

Write today for our Catalog No. 16-P-234

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They are preferred by successful operators on important projects everywhere. An index of their popularity is the steadily increasing volume of purchases—crushers and unit plants in all sizes, stationary and portable. Yes, Universal orders are piling up—not a sign of delay, but a tribute to demand.

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UNIVERSAL CRUSHER COMPANY

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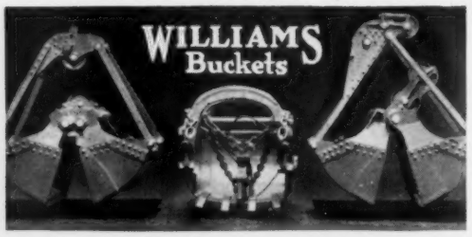

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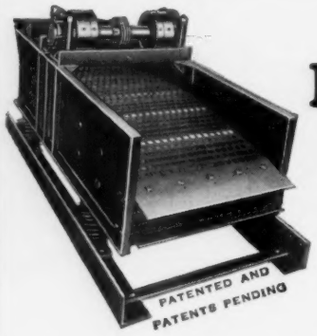

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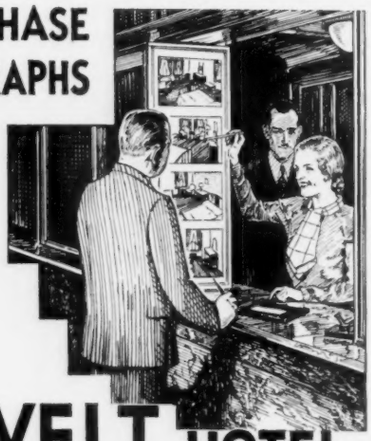

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This year's vast road program will give you the biggest opportunity for profits in a lifetime IF you are equipped for low cost operation!

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Primary crushing calls for the Gruendler-Blake type 24x36, all-steel crushing from 5" to 2½" or under. Also the latest Gruendler type Roller Bearing 15x24 and 15x36 for crushing 3" to 1½" or under.

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Elevators, revolving screens, conveyors and other equipment, designed and furnished for complete rock or gravel crushing and screening plants.

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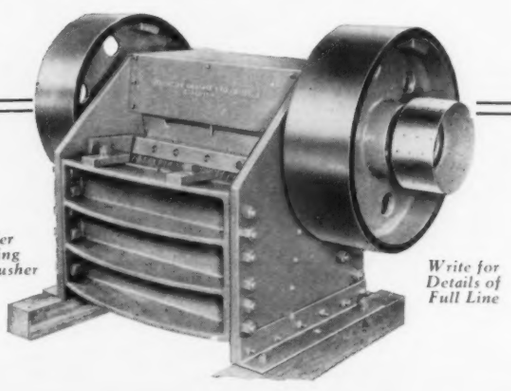

Roller Bearing Jaw Crusher

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These machines are today's most SENSATIONAL BARGAINS

IF your work demands additional loading or stripping equipment; or if your present shovel, dragline or crane is no longer efficient, then it will be to your advantage to write for further information and prices of these good-as-new machines. They are offered in ¾ to 1½ yard capacity. Each machine carries a new machine guarantee. Each machine is convertible into crane, dragline or shovel. Write today.

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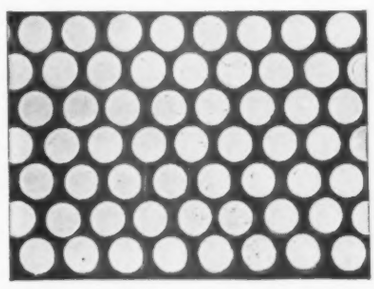
MORROW SCREEN PLATES



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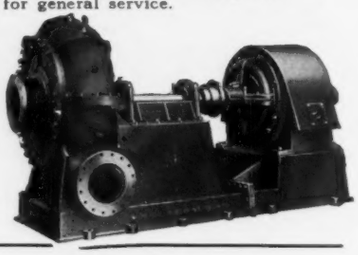
For hydraulic dredging, filling, sand and gravel production; hydraulic conveying of slurry and other liquids containing abrasive materials; clear water pumps for general service. Also complete dredges with all accessory equipment. Dredging pump designs include heavy-duty types and special alloy parts for severe service. Types and sizes for the largest or smallest operations, and for belt, motor, steam, oil or gasoline-engine drive.



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PYRASTEEL for high temperatures

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CRUSHERS—Double roll and Sledge Wedge Crushers, for practically any product. Capacities to 1000 tons an hour.

SUPER DRY PANS—For especially large tonnages.

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JIGS—For concentrating and beneficiating hematite and manganese ores.

SCREENS—Cylindrical and conical screens of any size and capacity.

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1—300 Westinghouse	CW-885	1800
1—300 Allis-Chalmers	2200 V.	505
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1—125 Fairbanks Morse	Type BV	900
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3-phase, 60 cycles, 220/440 v. unless specified

1—150 Allis Chalmers		1170
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Crushers (Hammer), Two, Penn. S-7	Ea.	450.00
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Clam Shell Bucket, 5-Yd., separately		1,250.00
Thew Elect. Shovel, S/G, 4-Wh., 1½ Yd., 1 Yd Dipper		800.00

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Steam Locomotives

All Equipped ASME Boilers

70-ton Porter 6-wheel saddle tank.
50-ton American 4-wheel saddle tank.
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25-ton 4-wheel Plymouth.
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30" Gates Gyratory Crusher AC Motor.
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60x84, 24x36, 14x36, 11x36, 8x36, 10x20, 9x16, 7x10, 4x10 Jaw Crushers.
2', 3', 4', 5½', 6' Symons Cone Crushers.
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Nos. 1, 2, 3 Vulcan Steam Pile Hammers.
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1 4½x6 Mundy Steam Swinging Gear.
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12, 16, and 20-yd. Side Dump Cars.
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1-yd. Link-Belt Cranes and Draglines.
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2—No. 3 McCulley gyratory crushers.
1—Size 42 in. x 16 in. set Allis-Chalmers crushing rolls.

CONVEYORS

2—18 in. x 117 ft. centers Link Belt heavy duty conveyors with self-propelling double discharge trippers.
2—16 in. x 48 ft. centers steel armoured belt conveyors with steel frame.

COMPRESSORS

1—Sullivan Class WG-3, size 14 in. x 12 in. 528 ft. cap. Serial No. 7410, horizontal belt driven.
1—Ingersoll-Rand type NE-1, size 10x10, horizontal belt driven.
1—48 in. dia. x 15 ft. long air receiver for above compressors.

CARS

22—2-yd. cap. 36 in. gauge end dump all steel quarry cars.
2—36 in. gauge quarry car tipples with safety device.

ELEVATORS

2—Link Belt No. 10 bucket elevators, 79 ft. centers, buckets size 18x12x9.
2—Link Belt bucket elevators 30 ft. centers, buckets size 10x8x6.
24—Size 16 in. x 16 in. cast iron bin gates, chain operated.
12—Size 18 in. x 18 in. cast iron bin gates.

HOIST

1—185 HP Allis-Chalmers double drum quarry hoist.

MOTORS

Total 1000 HP in 440 volt, 3 ph. 60 cy. with control equipment.
Slip ring 1—185 HP; 1—150 HP; 2—125 HP; 2—75 HP; 2—55 HP; 1—40 HP; 1—7½ HP.
Squirrel cage 1—75 HP; 1—30 HP; 1—25 HP; 1—20 HP; 1—15 HP; 2—10 HP; 1—1 HP.

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1—Allis-Chalmers 5 in. x 4 in. two stage type HVC centrifugal pump, cap. 400 GPM at 450 ft. head.
1—3 in. belt driven centrifugal pump.

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2—Allis-Chalmers all steel frame, heavy duty screens, 48 in. dia. x 24 ft. long, in 3 sections, with 1—10 ft. outside section.

PARTIAL LIST OF AVAILABLE ITEMS FROM OUR THREE REBUILDING PLANTS

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1—Chg. Pneu. 9x11, 150 ft. cap. with 30 HP. motor.
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15—Portable, gasoline driven; cap. 21, 92, 118, 210, 240, 310 cu. ft. Ingersoll-Rand, Sullivan, Chicago Pneumatic, Schramm and Domestic.
2—G.E. Centrifugal compressors, direct connected to 120 HP. A.C. motors, capacity 9000 ft. at 2 lbs. pressure.

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Large lot including std. ga. 6, 12-yd. and 20-yd., 36-ga. 5-yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.

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3—Robbins 24-in. conveyors with head and tail pulleys and troughing and return rollers for 150, 300 and 500-ft. centers.
5—Vertical bucket elevators with buckets attached to chain, from 42 to 80-ft. centers, some steel enclosed.
2—Barber-Greene Model 42-A bucket loaders on crawlers with 4-cyl. Buda engines.
4—14-in. Link Belt Sgrew, with steel frames and bearings.
4—12-in. Screw Type, 12 ft. long, silent chain drive.

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1—No. 5½ Symons coarse cone type.
1—Jeffrey Hammer Mill 24x12.
1—Sturtevant No. 0 Pulverizer.

CRANES AND DRAGLINES

1—Page Spud Walker Dragline 65-ft. boom, Diesel operated with 2-yd. Page bucket and Koehler lighting plant.
1—Northwest Type M Serial No. 2334—60 ft. boom, 1½-yd. dragline or clamshell bucket.
1—Northwest Model 104, Serial No. 1754, 45-ft. boom, 1½-yd. dragline or clamshell bucket.
1—P&H Model 600, with 50 ft. boom, 1-yd. dragline or clam; serial No. 2550.
1—Link Belt gasoline, Model K-1; 10-ton; 50 ft. boom; shop No. K-1024.
1—P & H Model 206, Ser. No. 2075, 40 ft. boom; 1-yd. clamshell; also shovel front with ⅞-yd. dipper.
1—Brownhoist No. 2 gasoline crane; 10-ton cap.; 40 ft. boom; shop Nos. 9964.
1—Bucyrus-Erie Model 1020, Ser. No. 11181, 30-ft. box type boom, ½-yd. dragline or clamshell bucket.
1—Industrial Brownhoist, type CC, gasoline, combination crane and shovel; ½-yd. dipper; 36 ft. boom.
1—Brownhoist No. 1; 7-ton cap.; with 35 ft. boom; gasoline.

CRANES (locomotive)

5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.

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Steel and wood, stiff leg, or guy.
4—Stiff leg: 1—20-ton Terry, 100′ boom; 2—15-ton American, 100′ boom; 1—10 ton American, 80′ boom.
12—Guy: 10—American, 15 ton; 2—Terry, 15-ton; all 100′ booms.

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Gasoline, electric and steam. All sizes.

LOCOMOTIVES

32—Gasoline locomotives from 14-ton to 2-ton, std. 36 and 24-ga.
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PNEUMATIC TOOLS

68—Ingersoll-Rand, Chgo. Pneu., and Thor jackhammers, concrete breakers, chipping hammers, spades, reamers, riveting hammers, wood borers, grinders and surfacers.

PUMPS

All sizes and types, both force, centrifugal and steam.

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15—St'm and Gas including 3—50B Bucyrus Nos. 10311, 9857, 9856; 2 Osgood 1½ yd. Nos. 1576 and 1575; 1—Bucyrus 30-B 1¼ yd., No. 3910 and 3—Northwests 2—1 yd., Nos. 2335, 3030, and 1—½ yd., No. 2538.

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14—Miles 36-in. gauge portable with steel ties.
5—Miles 24-in. gauge portable with steel ties.
100 tons of 35-lb. steel rail.

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GOOD USED CRUSHING, PULVERIZING, DRYING AND FILTERING EQUIPMENT—COMPLETE

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1—Bacon 10''x4'' Jaw Crusher.
1—Braun Chipmunk Crusher.
3—No. 00, No. 1, No. 1½ Sturtevant Rotary Fine Crushers.
1—Sturtevant No. 1 open door ring roll Mill.
4—No. 0000, No. 00, No. 0, No. 1 Raymond Mills.
1—Raymond three roll high side Roller Mill.
1—Bartlett & Snow No. 1 Hammer Mill.
2—Jay Bee No. 2B, No. 3B Hammer Mills.
1—Quaker City M-20 Hammer Mill.
1—Chicago Pneumatic type OCE two stage Air Compressor, 1730 C.F.M., with 300 H.P., 3 ph., 60 cy., 2200 v. synchronous motor.
1—Insley ¼ Yd. Excavator, with bucket attachments, gasoline driven, caterpillar trail.

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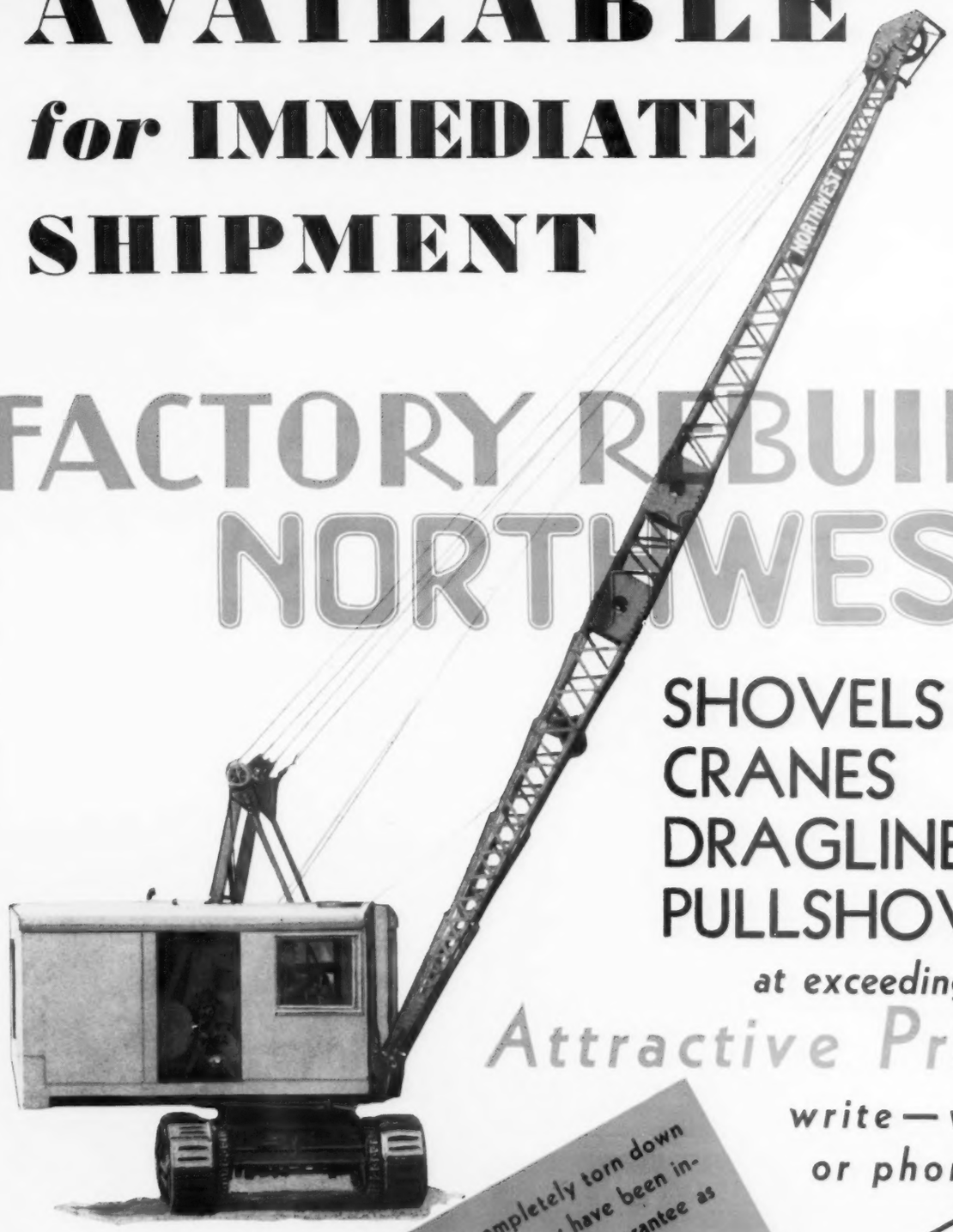

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Index to Advertisers

Allen-Sherman-Hoff Co..... 20
*Allis-Chalmers Mfg. Co..... 72
American Cable Co..... 6-7
American Sealdrok Corp..... 19
*American Steel & Wire Co.... 4
Amplex Mfg. Co..... 61
Atlas Powder Co.....10-11

Barber-Greene Co. 59
*Bartlett & Snow Co., C. O.... 59
Binks Mfg. Co..... 66
Birmingham Rail & Locomotive Co. 67
Broadcast Section.....67-71
Burnham, Royal E..... 70

Chicago Electric Co..... 67
Chicago Perforating Co..... 59
Chicago Steel Foundry Co... 66
Chrysler Motors..... 61
Climax Engineering Co..... 18

*Deister Concentrator Co..... 62
Deister Machine Co..... 64
*Dixie Mchy. Mfg. Co..... 61

*Eagle Iron Works..... 59
*Ensign-Bickford Co. 8
Equipment Corporation of America 68

General Motors Truck Co.... 1
Georgia Iron Works..... 62
Goodyear Tire & Rubber Co.. 3
*Gruendler Crusher & Pulv. Co. 65

*Hendrick Mfg. Co..... 13
*Hetherington & Berner, Inc.. 72

Industrial Brownhoist Corp.. 69
Iowa Mfg. Co..... 17

Jeffrey Mfg. Co..... 15

*Kennedy-Van Saun Mfg. & Engr. Corp. 63

Lane Co., T. J. 67
*Leschen & Sons Rope Co., A. .....Inside Back Cover
Lewistown Foundry and Machine Co. 66
*Link-Belt Co..Inside Back Cover

McLanahan and Stone Corp.. 66
Machinery Sales Corp..... 67
Manganese Steel Forge Co... 66
Morris Machine Works..... 66
Morrow Mfg. Co..... 65
Mott Core Drilling Co..... 70

Northwest Engr. Co..... 71

Ohio Power Shovel Co....65-72

*Pangborn Corp. 57
Pennsylvania Drilling Co.... 70
Pettibone Mulliken Co..... 12
Productive Equip. Corp..... .....Front Cover

*Robins Conveying Belt Co... 5
Roosevelt Hotel..... 64

*Sauerman Bros. Inc..... 59
Self-Vulcanizing Rubber Co., Inc. .....Inside Front Cover
Smith Engr. Works..Back Cover
Sprague & Henwood, Inc.... 70
*Sprout, Waldron & Co..... 66

Thermoid Rubber Co..... 14

Universal Crusher Co..... 64

Wellman Engineering Co.... 64
Williamsport Wire Rope Co.. 16

***See also information in the 1933 Pit and Quarry HANDBOOK**

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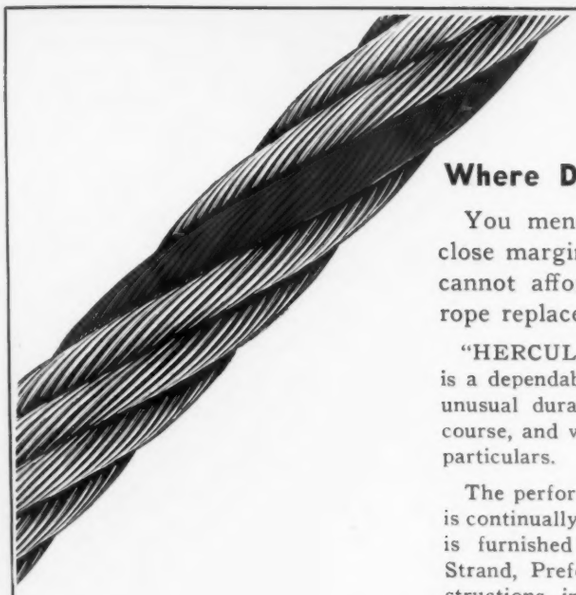

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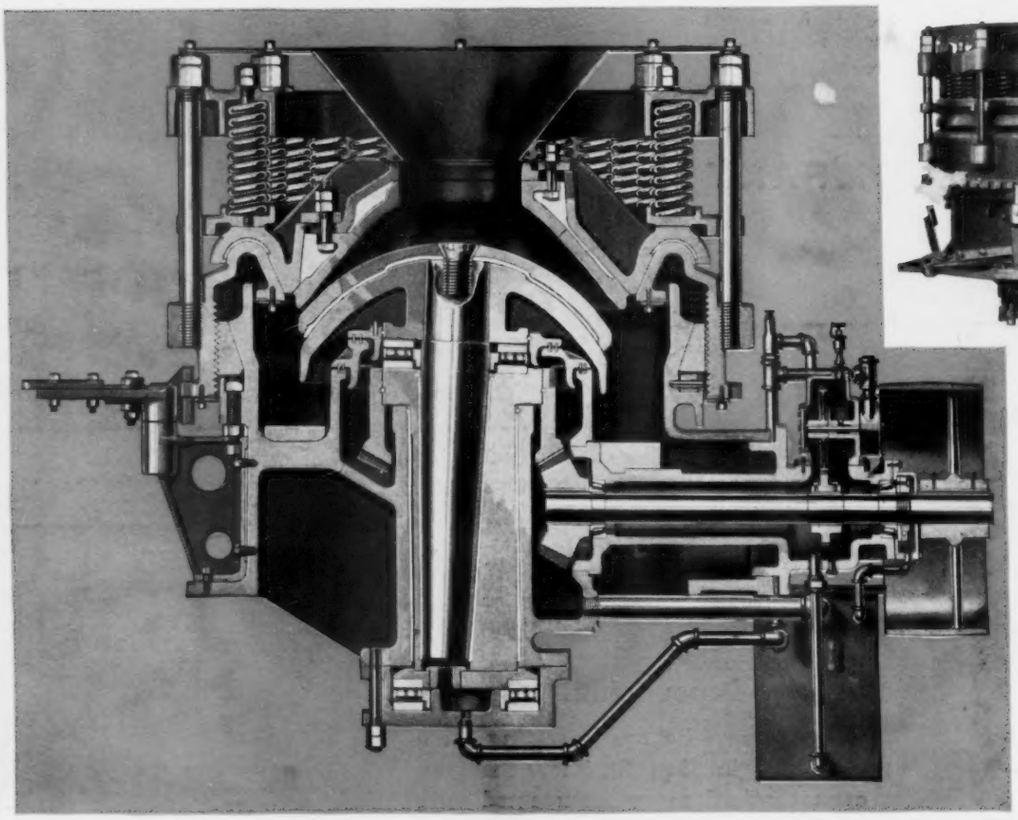

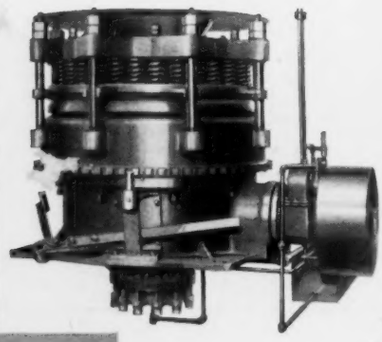

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YC-2

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